

TEACHING AND LEARNING IN SUSTAINABLE AGRICULTURE CURRICULA: A
CASE STUDY OF FACULTY WORK AS LEARNING AT A LAND GRANT UNIVERSITY

Jennifer Louise Helms

Dissertation submitted to the Faculty of the Virginia Polytechnic Institute and State University in
Partial Fulfillment of the Requirements for the Degree of

Doctor of Philosophy
Agricultural and Extension Education

Kim L. Niewolny, Chair

Susan F. Clark

Kate D. McConnell

Curt R. Friedel

March 24, 2014

Blacksburg, Virginia

Keywords: Engagement, Civic, Qualitative, Sociocultural Learning, Experiential Learning,
Collaborative Teaching, Service-Learning, Sustainable Agriculture Education

TEACHING AND LEARNING IN SUSTAINABLE AGRICULTURE CURRICULA: A CASE
STUDY OF FACULTY WORK AS LEARNING AT A LAND GRANT UNIVERSITY

Jennifer Louise Helms

ABSTRACT

In 2009, the National Academy of Sciences called for a dynamic approach to teaching and learning in colleges of agriculture. In response, innovative faculty at colleges and universities are implementing new frameworks for undergraduate education in the agricultural sciences. The purpose of this study, therefore, was to explore the experience of faculty teaching and learning in sustainable agriculture education curricula at a land grant university. A qualitative research methodology employing a case study approach was utilized. Methods of data collection included semi-structured interviews, participant/observer field notes, and secondary data analysis. This study contributed to understanding faculty work as learning by illustrating the triad approach to teaching and learning in the Civic Agriculture and Food Systems (CAFS) minor comprising core areas of experiential learning, interdisciplinary teaching and learning, and community engagement. This triad approach to teaching and learning brings together a framework for understanding faculty work as a social practice and the inherent learning that occurs. CAFS faculty upheld the land-grant mission of their institution by promoting community engagement, experiential learning, and interdisciplinary collaboration toward teaching and scholarship. CAFS faculty learned from interactions with other faculty outside and within their disciplinary and departmental homes, which enhanced their teaching/learning experience. Collaborative work was described as a practice where faculty from different disciplinary perspectives and cultural practices engage in a collaborative teaching model that communicates value for resources to administrative leadership and clarifies navigation of faculty reward structures. Additionally, these faculty members were able to

participate in an emerging pedagogical practice where service-learning and community partners were embedded in the curriculum, which legitimized the role of the community partner as educator. The findings from this research are expected to be useful for implementation in other sustainable agriculture education programs at other universities. This study may also serve as a catalyst for the adoption of collaborative and interdisciplinary teaching in colleges of agriculture. The implications of this research can inform an assessment methodology for agriculture education programs, as well as to create a framework whereby the essential tenets of the sustainable agriculture education movement in higher education can be promulgated in different disciplines.

ACKNOWLEDGEMENTS

This dissertation is the fruition of countless hours of thoughtfulness, insight, and support from many professional and personal influences. First I would like to thank my chair, Dr. Kim Niewolny for shepharding me through the process and teaching me so much along the way. Your time given to me has been invaluable. This has been one of the most difficult experiences I have tackled and I know I would not have the quality work that I have now without your drive toward producing the best work possible. No matter how frustrated or ready I was to just get it done, I left your office with motivation. I acknowledge Dr. Susan Clark, without her efforts to create such a student driven minor I would not have had the most wonderful experience teaching and learning in higher education. Susan was always an ear to listen and give guidance to navigating my way through the weeds. Thank you for your passion. Dr. Kate McConnell was invaluable to both my graduate education and my research, teaching me a skillset in assessment that has made me more valuable as a faculty member. Thank you for sharing your expertise and also for helping me navigate the strategic process of employment and networking. I would also like to thank Dr. Curt Friedel for bringing to light the role of the educator and giving such keen insight to the overall process and learning theory. After acknowledging my committee members that shared this process with me I would like to thank the Civic Agriculture and Food Systems Curriculum Taskforce for allowing me to participate as a researcher with them teaching and learning in sustainable agriculture education curricula. I also want to acknowledge the Agricultural and Extension Education deparment faculty, staff and students for creating such a wonderful collaborative environment to grow as a graduate student and professional. I want to also thank Jenny Schwanke for always being a voice of compassion, encouragement, and validation. Our talks have meant more to me than you know.

Personally, I would not have made it through the ups and downs of the graduate life without the support of Andrew Culhane. From little surprise massage certificates to weekend getaways and garden planning, there was always positive energy and fun love to get me past the hysterics. I am so very happy that I have made my home in Blacksburg with you and know that there are still so many more amazing experiences to come as we travel along this path together. Words are powerful and the words that ease my mind and heart are “you are not alone”, with these words I know there are great things to come. I love you.

TABLE OF CONTENTS

ABSTRACT	ii
ACKNOWLEDGEMENTS	iv
LIST OF TABLES	ix
LIST OF FIGURES	x
CHAPTER 1 INTRODUCTION	1
Sustainable Agriculture Education	2
Civic Agriculture and Food Systems Minor at Virginia Tech	4
Problem Statement	7
Objectives of the Research	9
Research Questions	10
Methodological Framework	10
Significance of the Study	11
Clarification of Terminology	13
CHAPTER 2 REVIEW OF THE LITERATURE	16
The Land Grant University: Historical Engagement and Sustaining the Mission	16
Post-Secondary Agriculture Education	20
The Call for a Civic Education	20
Scholarship of Engagement	22
Experiential Learning Theory and Practice	23
Engagement through Sustainable Agriculture Education.....	26
Civic Agriculture as Civic Pedagogy	28
Sustainable Agriculture Education: Pedagogical Practice and Role of the Educator	30
Situated Learning and Service-Learning: Bridging Theory to Practice	32
Sociocultural Orientations Toward Experience and Knowledge	34
Experiential Learning in Sustainable Agriculture Education	41
Faculty Work as Learning through Practice	44
Sociocultural Learning Perspective of Faculty Work.....	48
Faculty Work as Collaborative and Interdisciplinary Practice	50
Scholarship of Teaching as Faculty Learning	54
Facilitation of and Impediments to Faculty Learning	56
Summary of Theroetical Framework	59
Conclusion	61
CHAPTER 3 RESEARCH DESIGN AND METHODOLOGY	63
Research Questions	63
Ontological and Epistemological Positioning	64
Assessment in Higher Education: A Methodological Perspective	66

Qualitative Inquiry: Justification for Research Design	69
Qualitative Inquiry: Defining Characteristics.....	70
Rationale for Qualitative Embedded Single Case Study Design.....	71
Research Design	73
Participants	73
Data and Data Collection Procedures	75
Data Analysis Procedures	81
Issues of Generalizability and Credibility	81
Trustworthiness: Criteria for Establishing Rigor and Credibility in Qualitative Inquiry.....	82
Researcher Reflexivity	85
Limitations of the Study	87
CHAPTER 4 FINDINGS	88
Questions Guiding this Study and Emergent Themes	88
Theme 1: Collaborative Teaching in Higher Education	93
Roles and Participation in Collaborative Teaching	94
Understanding the Collaborative Teaching Model.....	105
Feelings toward Collaborative Teaching	108
Learning Pedagogical Practices	109
Navigating Administrative Structure.....	112
Navigating Collaborative Work.....	117
Outcomes of Collaborative Work.....	123
Theme 2: Interdisciplinary Teaching in Practice	126
Learning Disciplinary Knowledge.....	126
Recognizing Disciplinary Perspectives	128
Understanding Interdisciplinarity	130
Theme 3: Service-Learning as a Reflective/Critical Practice	134
Understanding Service-Learning as a Pedagogical Practice	135
Understanding the Community Partner as Educator	139
Theme 4: Participation in Sustainable Agriculture Education Programs	143
Identifying Student Learning	144
Learning Situated in Sustainable Agriculture Education	146
Teaching in Sustainable Agriculture Education	150
CHAPTER 5 SUMMARY, DISCUSSION and CONCLUSIONS	154
Summary of Study	154
Discussion	158
Research Sub-question #1: How do faculty understand and participate in collaborative teaching?	158
Research Sub-question #2: How do faculty understand and participate in interdisciplinary teaching?	162

Research Question #3: How do faculty understand and participate in service-learning as a pedagogical practice?	165
Research Question #4: What sociocultural outcomes might result from faculty learning within this sustainable agriculture education program?	167
Implications for Practice	169
Principles of Sustainable Agriculture Education.....	169
Collaborative Teaching Model	171
Service-Learning as Critical/Reflective Pedagogy: Criteria for SL in the Classroom	172
Implications for Research.....	174
Conclusion.....	175
REFERENCES.....	178
APPENDICES	190
Appendix A: Semi-Structured Interview Questions	190
Appendix B: Interview Consent Form	193
Appendix C: Interview Participation Email Communication	195
Appendix D: Observation Verbal Consent Protocol.....	196
Appendix E: Powerpoint Slides used to gain verbal consent in ALS 2204 Fall 2013	198
Appendix F: Additional Supporting Data.....	199
Appendix G: IRB Approval Letter	204

LIST OF TABLES

Table 1. Data Collection Protocol.....	78
Table 2. Data Collection Timeline.....	79
Table 3. A Priori Propositions	80
Table 4. Code Mapping: Three Iterations of Analysis.....	89
Table 5. Emerging Research Themes and Related Categories	92
Table 6. Code Matrix: Roles and Participation in Collaborative Teaching.....	95
Table 7. Code Matrix: Understanding the Collaborative Teaching Model	106
Table 8. Code Matrix: Feelings Toward Collaborative Teaching	108
Table 9. Code Matrix: Learning Pedagogical Practices.....	109
Table 10. Code Matrix: Navigating Administrative Structure.....	112
Table 11. Code Matrix: Navigating Collaborative Work	117
Table 12. Code Matrix: Outcomes of Collaborative Work.....	123
Table 13. Code Matrix: Learning Disciplinary Knowledge	127
Table 14. Code Matrix: Recognizing Disciplinary Perspectives	128
Table 15. Code Matrix: Understanding Interdisciplinarity.....	131
Table 16. Code Matrix: Understanding Service-learning as a Pedagogical Practice.	135
Table 17. Words that Faculty Used to Describe Service-Learning	137
Table 18. Code Matrix: Understanding the Community Partner as Educator	140
Table 19. Code Matrix: Identifying Student Learning.....	144
Table 20. Code Matrix: Learning Situated in Sustainable Agriculture Education	146
Table 21. Code Matrix: Teaching in Sustainable Agriculture Education.....	150
Table 22. Course Assignments from ALS 2204 Fall 2013 syllabus obtained from P42.....	151
Table 23. Criteria for Service-Learning in the Classroom.....	173

LIST OF FIGURES

Figure 1. Theoretical Framework	58
Figure 2. Data Collection Protocol Map	75

CHAPTER 1

INTRODUCTION

Colleges of agriculture throughout the nation are enhancing curricula through the implementation of sustainable agriculture education (SAE) programs. According to Delate (2006), SAE is emerging as a powerful strategy for agriculture education that addresses many complex issues facing society today, including “ecological or environmental health benefits; economic viability and a policy resource use that does not compromise the lives of future generations; and social benefits including social justice, human empowerment, and human health and safety” (p. 445). Hilimire, Gillon, McLaughlin, Dowd-Urbe, and Monsen (2014) define sustainable agriculture education through the lens of food systems, encompassing all aspects of production processes; relationships between actors, organizations and agroecosystems; and the influences of policy, economics, and culture on knowledge and labor. As an offshoot of the mission of the land grant university, SAE emphasizes a triad approach to teaching and learning, exemplifying curricula that are experiential, interdisciplinary, and fostering community engagement (Clark, Byker, Niewolny, & Helms, 2013; Hammer, 2004; Niewolny, et al., 2012; Parr & VanHorn, 2006; Parr et al., 2007). This triad ultimately fulfills one of the land grant goals of effective outreach to society. Exploring the implications of SAE curricula, insights gained through community-university partnerships, assessment of student learning, and faculty development all present opportunities to strengthen agriculture education and reconnect it with our changing agrofood system. The purpose of this study, therefore, is to explore the mediated learning of faculty engaged in experiential-based SAE curricula at a land grant university. Specifically, I seek to understand the strategies and methodologies that faculty use in connection with learning-through-engagement with faculty, community partners, and students.

Sustainable Agriculture Education

The National Academies of Science (NAS) (2009) report, *Transforming Agriculture Education for a Changing World*, calls for a dynamic approach to teaching and learning in colleges of agriculture that focuses on enhancing curricula and student experiences to prepare graduates for careers in a changing landscape of agrofood system development and production. In response to the NAS report, ecological concerns, and other pressures, land grant universities are being reawakened to their historical mission of education, research, and extension in new and dynamic ways—one of which is the emergence of sustainable agriculture education. SAE represents an important educational approach that addresses many complex social and environmental problems, wherein educators are blending theory and practice to develop experiential learning environments that view students as the focal point of the process (Parr, Trexler, Khanna, & Battisti, 2007). SAE encompasses environmental, social, and economic issues in the local, regional, and global agrofood system. The many challenges facing colleges of agriculture can be addressed in part through innovative pedagogical approaches to meet the needs of all stakeholders (internal and external to academia) who are in some way involved in agriculture education programs. For example, the charge to administration and faculty involved in curricula development is to create a framework that meets the needs of the student population, the institution, and the wider community. High-impact practices identified by Kuh (2010) such as first-year seminars, learning communities, service-learning, undergraduate research, and capstone courses and projects are frequently implemented in SAE (Clark et al., 2013; Parr, Trexler, Khanna, & Battisti, 2007; Parr & Van Horn, 2006).

The practice of SAE has experienced remarkable growth in the past two decades (Jacobsen et al., 2012). Not surprisingly, SAE programs vary in content, structure and focus

depending on regional needs, administrative and financial support/resources, and student interests. SAE programs at land grant universities typically design curricula around sustainable agriculture, organic agriculture, agroecology, civic agriculture, and food systems (Clark et al., 2013; Francis et al., 2011; Parr & Van Horn, 2006). Despite their content variability, however, SAE programs share common educational approaches—principally involving experiential and interdisciplinary curricula (Parr, Trexler, Khanna, & Battisti, 2007).

The course content and requirements associated with SAE also vary from undergraduate to graduate programs, college majors and minors, associate degrees, to certificate options (Sustainable Agriculture Education Association [SAEA], 2014). According to the SAEA (2014), 31 land grant universities, 12 state and private universities, 10 community and junior colleges, and 3 international universities currently promote SAE by continuing enhancement and/or expansion. Educational stakeholders involved in the design of SAE curricula at land grant universities are increasingly seeking to promote larger community-based dialogue fostered through community-university partnerships. Byrne (2000), focusing on work from the Kellogg Commission, argued that the defining characteristic of universities today should be engagement beyond the original mission of the land grant university (LGU) as defined by the Morrill Act of 1862:

To teach such branches of learning as are related to agriculture and the mechanic arts, in such manner as the legislature of the States may respectively prescribe, in order to promote the liberal and practical education of the industrial classes in the several pursuits and professions in life. (Section 4)

In response, undergraduate curricula and student experiences are being redesigned to reflect the changes in food and agriculture, society, and technology; specifically, they now incorporate a

more dynamic approach to agriculture education that is represented through a variety of SAE programs (Peters, 2006). Enhancing outreach and extension, service-learning opportunities creates space for undergraduates to explore real world applications of concepts, ideas, and beliefs initially conveyed through traditional instructional techniques (Clark et al., 2013).

Colasanti, Reau, and Wright (2009) suggested that the time is right for restructuring the model of education and leadership to broaden the land grant university mission. And indeed—for some time now land grant universities have been incorporating organizational changes that are moving them toward more civic- and community-based learning/research opportunities. As the literature confirms, this push for community engagement with institutions of higher education is advancing support toward research, student civic engagement, and community outreach (Byrne, 2000; Butin, 2010; Colasanti, Reau, & Wright, 2009; NAS, 2009). Sustainable agriculture education can uphold the third land grant university mission of service and outreach to society through a triad approach to teaching and learning incorporating experiential, interdisciplinary, and community engagement as core elements (Clark, Byker, Niewolny, & Helms, 2013; Hammer, 2004; Niewolny, et al., 2012; Parr & VanHorn, 2006; Parr et al., 2007).

Civic Agriculture and Food Systems Minor at Virginia Tech

Engagement through collaboration and interdisciplinarity is occurring across the Virginia Tech campus. In particular, the Civic Agriculture and Food Systems (CAFS) minor within the College of Agriculture and Life Sciences is spearheading an approach to community engagement through experiential learning by involving students, community partners, and faculty in collaborative teaching and learning. The CAFS concept and philosophy is based partly on the value-based model of community development espoused by Heifer International (Aakers, 2008), and partly on Lyson's (2004) framework for civic agriculture. This value-based approach used

by Heifer International centers on six cornerstones that were adapted within the CAFS minor: 1) food security-sovereignty, 2) civic engagement and democratic participation, 3) strong local economies, 4) ecological stewardship, 5) healthy people and communities, and 6) collaborative teaching and experiential learning (Clark et al., 2013).

Wynne (2006) described the civic agriculture framework as addressing the social, economic, and environmental concerns of sustainable agriculture with added emphasis on civic engagement and local culture. Lyson's (2004) civic agriculture model is promoted by Wynne (2006) for use in SAE. Through collaborative agreement on the program's core values and philosophical goals; the Civic Agriculture and Food Systems taskforce—a decision-making body of faculty, community-partners, institution administration, and graduate students—developed programmatic goals and student learning outcomes for the minor. Undergraduates intending to minor in CAFS are required to take four courses: 1) ALS 2204, Introduction to Civic Agriculture; 2) ALS 3404, Ecological Agriculture; 3) ALS 4204, Concepts in Community Food Systems; and 4) ALS 4214, Capstone in Civic Agriculture and Food Systems. According to Francis et al.'s (2011) work on critical aspects of learning landscapes, connecting these courses in a meaningful manner requires specific development objectives: (a) course design that establishes learning is a social and individual process; (b) knowledge and competencies must go beyond technical skills and involve experience in a broad capacity; (c) experiential learning occurs within communities in the field; (d) service- and community-based learning are guides for community engagement in learning; (e) teaching occurs in interdisciplinary teams; (f) interactions are frequent and meaningful; (g) solutions require practical models and complex problem solving; (h) pedagogy is a work in progress; (i) evaluation is an integral and continuous part of curriculum development; and (j) intense educator involvement and resources are needed

for success. Collaborative teaching teams in the minor are comprised of faculty from multiple disciplines and include community-partner stakeholders (Clark et al., 2013).

Transcending the brick-and-mortar walls of the institution, the CAFS minor integrates service-learning into credit-earning courses, thereby helping the student to meet university requirements while at the same time creating strong community-university relationships that serve as a seedbed for community engagement in higher education (Clark et al., 2013; Galt et. al. 2012; Niewolny et. al. 2012). Grossman et al. (2012) suggest that the incorporation of community-based learning experiences can enhance student learning outcomes in the areas of social and environmental issues in tandem with reflection on those experiences while “meeting the needs of the local community” (p. 181). Specifically, the following community partners support the Civic Agriculture and Food Systems minor: Virginia Tech Dining Services, Heifer International (an international values-based community development organization), Glade Road Growing (a small intensive urban farm), and the VT YMCA Hale-Y Community Garden. Collaborative teaching teams provide instruction of the core courses in the minor.

Kuh (2010) reported that students engaged in service-learning experiences increased academic achievement, meaningful civic engagement, and personal growth. The CAFS minor at Virginia Tech integrates the practice of service-learning into curricula in order to enhance civic engagement through community-based learning opportunities. The Association of American Colleges and Universities (2010) calls for an integrated approach to teaching and learning—often through unscripted lessons whereby students connect multiple threads of knowledge via a collaborative process to develop a variety of innovative solutions. By integrating multiple approaches to teaching and learning in higher education “colleges and universities can provide more opportunities for students to apply their learning to new contexts and to develop strong

communities in and out of the classroom” (Association of American Colleges and Universities, p. 43). Going beyond established knowledge and skills, integrated learning creates a framework for students to address issues affecting the agrofood system in a practical and applied manner. The student population enrolled in the Civic Agriculture and Food Systems Minor is comprised of all 8 colleges at Virginia Tech (Clark, Byker, Niewolny & Helms, 2013).

Also important to the CAFS program, its curriculum was designed with assessment of student learning in mind (Clark et al., 2013). The culmination of the students experience in the minor is showcased in the capstone course. This is a class that requires the student to demonstrate all that he or she has learned in the minor. It involves designing, implementing, and evaluating a community action project and presenting the experiences to an audience of peers, community partners and faculty. The Civic Agriculture and Food Systems Taskforce developed the capstone course with the intention of applying learned skills and knowledge from previous courses to issues in community settings. Kuh (2010) asserted that even greater student learning outcomes will be obtained with the integration of multiple high impact practices in undergraduate curricula. Capstones and service-learning are two high impact practices specified by Kuh (2010) that are implemented into the CAFS curriculum. Kuh (2010) describes advantages of high impact practices as being “higher grades, higher persistence rates, intellectual gains, greater civic engagement, increased tolerance for and engagement with diversity, and increased interaction with faculty and peers,” (p. 45).

Problem Statement

Scholarly investigations of the practice of SAE do exist and provide valuable insights for practitioners (Clark, Byker, Niewolny, & Helms, 2013; Hammer, 2004; Niewolny, et al., 2012; Parr & VanHorn, 2006; Parr et al., 2007). However, there is a lack of in-depth knowledge of

faculty work as learning in SAE curricula where collaborative and interdisciplinary teaching practices are becoming embedded into the pedagogy. Best practices for implementing SAE curricula can be developed by examining the work of Wenger and Hornyak (1999) on team teaching and their suggested strategies for collaborative teaching in an interdisciplinary and integrated course. As the researchers recently described, collaborative team teaching can vary from multiple educators in a single course to a collaborative learning community where courses are linked. To achieve a deeper understanding of content and connect programmatic goals and student learning outcomes, an interdisciplinary approach to collaborative team teaching is recommended. Wenger and Hornyak recommended a more integrated approach to teaching and learning where multiple perspectives (even competing viewpoints) can be shared and discussion can occur to address the complexity of issues.

According to scholars, one of the cornerstones of SAE is that in contrast to traditional agriculture education it transforms the classroom from instruction-centered to learning-centered (Galt, Clark & Parr, 2012). As explained by Barr and Tagg (1995), this difference means that institutions accept responsibility for developing students who learn instead of merely hiring professors who teach. Moreover, the purpose of higher education needs to be reengaged with a civic mission to connect the social with academic goals, knowledge competencies with personal commitment, and the university with the larger world. (Colby, Ehrlich, Beaumont, & Stephens, 2003).

Innovative faculty at colleges and universities are implementing new frameworks for undergraduate education, which include programmatic options for certificates, minors, and majors in certain fields. Reengagement and changes in higher education have been pronounced over the past two decades, with some notable reports including the Boyer Commission's (1998)

“Reinventing Undergraduate Education: A Blueprint for America’s Research Universities,” the Kellogg Commission’s (1999) “Returning to Our Roots: The Engaged Institution,” and the National Academies of Science’s (2009) “Transforming Agriculture Education for a Changing World.” SAE advocates a new approach to undergraduate agriculture education curricula—one that incorporates sustainable, civic, and agroecological perspectives at the forefront of a changing agricultural landscape (Battisti, Passmore & Sipos, 2008; Francis et al., 2008; Francis et al., 2011; Galt et al., 2012; Jacobsen et al., 2012; Niewolny et al., 2012). Faculty engaged in SAE program design, implementation, and assessment are transforming the academic workplace into a renewed space for faculty learning.

Objectives of the Research

The purpose of this study is to explore the experience of faculty teaching and learning in experiential-based sustainable agriculture education (SAE) curricula at a land grant university (LGU). Specifically, I seek to understand faculty work as learning-through-engagement with faculty, community-partners, and students. In doing so, I drew upon a sociocultural learning framework informed by Fenwick (2000, 2003), Lave and Wenger (1991), and Lattuca (2001). First, Fenwick’s (2000, 2003) understanding of experiential learning is expanded to reject the division of mind and body in the learning process, instead calling for an embodied approach to experience as learning. Second, Lave and Wenger (1991) informed the learning process explored in this study by enhancing a sociocultural orientation toward learning through the perspective of situated learning. This pedagogical orientation views learning as both integral and inseparable from social practice—and thereby promulgating mutually-constitutive associations between and among activity, agent, and world. Third, Lattuca’s sociocultural approach to interdisciplinary teaching, scholarship, and research reinforced how the work of faculty and community partners

can and should inform interdisciplinary practice. The role of service-learning (SL) in community-university partnerships is further emphasized by Jacoby (2006). To that end, I evaluated the process of SL as a viable pedagogical practice to enhance experiential-based curricula in sustainable agriculture education at an LGU. Lastly, SAE is explored as an emerging solution to complex issues in the current agrofood system; it is also proposed as a powerful catalyst for revitalizing the LGU mission through innovative praxis.

Research Questions

In order to address the objectives stated above, this study utilized the single embedded case study framework informed by Yin (2012, 1997). The following research question and related sub-questions guided this investigation of SAE at a land grant university:

From the perspective of sociocultural learning, how do faculty learn within a sustainable agriculture education program at a land grant university?

1. How do faculty understand and participate in collaborative teaching?
2. How do faculty understand and participate in interdisciplinary teaching?
3. How do faculty understand and participate in service-learning as a pedagogical practice?
4. What are social outcomes relevant to the role of sustainable agriculture education faculty at a land grant university?

Methodological Framework

A qualitative research methodology was employed via a case study approach to explore an SAE minor at an LGU. The proposed methods of data collection included semi-structured interviews, participant/observer field notes, and secondary data analysis. Drawing on a sociocultural learning framework informed by Fenwick (2000, 2003), Lave and Wenger (1991),

Lattuca (2001), a single embedded case study informed by Yin (2012, 1997) informed the design and implementation of this study. The main unit of analysis was faculty who are teaching/learning in the CAFS minor in the College of Agriculture and Life Sciences at an LGU, with embedded subunits of analysis comprised of other collaborative alliances engaged in the minor: faculty-faculty partnerships, faculty-community partners' partnerships, and faculty-student partnerships. Purposeful sampling was implemented for the selection of participants based on membership in the CAFS Taskforce and a collaborative teaching team role in one of the four core courses in the minor.

Faculty and community-partner (who will remain anonymous) participated in semi-structured interviews. Interviews also allowed the researcher to collect historical information and gain essential insights in instances when the participant cannot be observed directly (Creswell, 2009). The researcher also acted as participant-observer throughout the Fall 2013 course and collaborative teaching team meetings, ALS 2204, Introduction to Civic Agriculture, and the CAFS Curriculum Taskforce meetings, in order to enhance data collection by observing and recording information. Secondary data collected through use of written documents created in the CAFS Taskforce Assessment workshop and course syllabi informed the overall process

Significance of the Study

Opportunities are increasing for creating experiential, interdisciplinary degree programs that emphasize community engagement across departments and colleges in higher education. Stakeholders associated with the Civic Agriculture & Food Systems minor at Virginia Tech (VT) are in the process of shaping a model program that combines community engagement, interdisciplinary curricula, and experiential learning. The findings from this research are expected to be useful for implementation in other SAE programs at other universities—both

public and private by enhancing understanding of interdisciplinary & collaborative teaching encouraging faculty and university leadership to integrate high impact practices such as service-learning in agriculture education . Results generated from this study may also serve as a model for the adoption of interdisciplinary and experiential-based curricula incorporating community engagement in colleges of agriculture enhanced by SAE curricula. Further exploration of the significance of Sustainable Agriculture Education curricula reveals the impact on colleges of agriculture, which can address the call for change by the National Academies of Science (2009). The incorporation of interdisciplinarity, collaborative teaching and research agendas, and experiential-based learning into agriculture education are suggested to reach the goal of transforming agriculture education to maintain pace with the changing global agrofood system and related opportunities for student career success (NAS, 2009).

The implications of this research might also be used to inform an assessment methodology for SAE programs, as well as to create a framework whereby the essential tenets of the SAE movement in higher education can be promulgated in different disciplines. Assessment as a method for understanding a case such as an educational program can enhance faculty, community and university stakeholder, and administration's participation and acceptance of the current paradigm shift occurring in higher education. This shift toward a student-centered approach to teaching and learning is accompanied by alternative pedagogical practices that stretch the traditional perspective of the role of faculty and student both in and outside of the classroom. The benefit of this type of inquiry to institutions is to gain an understanding of the context that decision makers are working within

How faculty understand and participate in this changing environment in colleges of agriculture and the general climate of higher education is imperative. The role of faculty work as

learning is critical in regards to the changes occurring in the academy. In order for institutions of higher education to fully engage in this shifting paradigm, a change in understanding the learning process and the factors and contexts that promote and sustain faculty learning, building upon faculty work as learning scholarship. This involves the development of a framework in higher education for understanding faculty work as a learning process. Agriculture education has the timely opportunity to be on the forefront of the scholarship of teaching and learning combined with the growing scholarship of assessment that is being promulgated in sustainable agriculture education programs. This scholarship can enhance the understanding of faculty learning and development when participating in collaborative and interdisciplinary work enhanced through community engagement. Faculty have the opportunity to augment the interdisciplinarity of undergraduate degree programs to the benefit of both student and educator. But given the increasing overlap of many academic programs, faculty working with a single discipline are also taking advantage of burgeoning opportunities for collaborative learning within disciplines. According to Lattuca (2005), faculty learning positively impacts classroom engagement and effectiveness, as well as the larger scholarly community.

Clarification of Terminology

The following terms are defined for clarity through usage in this study:

Agricultural Literacy: Possessing knowledge and understanding of our agrofood system.

Ability to synthesize, analyzes, and communicates basic information about agriculture and food systems.

Civic Agriculture: An innovative approach to reconnecting the agrofood system through community-based agriculture and food and fiber production where the social, economic, and environmental impacts of practices are considered. Examples of

spaces that are being created to foster civic agriculture include formal and informal farmers markets, community supported agriculture, and community gardens. What they have in common is the implementation of effective, community-based methods that foster the production, processing, and distribution of food and fiber products (Lyson, 2004).

Civic Engagement: Addresses a wide range of social issues to engage students, faculty, and community stakeholders in higher education. Engaged relationships foster the development of citizens toward more responsible and active roles in society. One such example is the reestablishment of civic purpose in higher education and reconnection to the land grant university mission (Glass & Fitzgerald, 2010).

Community-University Partnerships: Innovative, mutually beneficial partnerships between institutions of higher education and community members. Community-based learning is emphasized through the practice of service-learning. Learning outcomes from engagement in these partnerships will be explored in this study (Jacoby, 1996).

Experiential Learning: An overarching philosophy, epistemology, and pedagogy that views experience as central to the process of teaching and learning; it considers experience as an embodied process of learning whereby the learner interacts in both the cognitive and physical sense through reflective practice (Fenwick, 2003).

Interdisciplinarity: The combination of multiple disciplines where “new knowledge structures are established by the integration of different disciplinary perspectives theories and methods” (Godemann, 2006, p. 52). Faculty involved in

interdisciplinary research and teaching are likely to gain new knowledge and perspectives from other disciplines (Lattuca, 2001).

Situated Learning: A condition wherein learning is both integral and inseparable from social practice, thereby enhancing the activity of learning to include the mutually constitutive relationship of activity, agent, and world (Lave & Wenger, 1991).

Sociocultural Learning: A social orientation toward learning theory that is inclusive of culture, history, environment, and people interacting to shape learning outcomes (Lattuca, 2001).

Sustainable Agriculture: A philosophy and practice incorporating a holistic view of agrofood system production, processing, and distribution through the lens of social, economic, and environmental impacts. Sustainable agriculture is also a complex system of varied approaches where the overarching purpose is to sustain the natural environment for future generations in a manner where technology is not a replacement, but an enhancement, to our agrofood system (Pretty, 1995).

Sustainable Agriculture Education: An emerging approach to undergraduate agriculture education curriculum that incorporates sustainable, civic, and agroecological perspectives. SAE represents a pedagogical discourse addressing many complex social and environmental problems, wherein progressive educators are blending theory and practice to develop experiential learning environments with the student as the focal point of the process (Parr & Trexler, 2011).

CHAPTER 2

REVIEW OF THE LITERATURE

“If we are to open space for knowing, we must be alert to our fear of not knowing and to our fearful tendency to fill the learning space. First, we must see that not knowing is simply the first step toward truth, that the anxiety created by our ignorance calls not for instant answers but for an adventure into the unknown” (Palmer, 1993, p. 72).

Post-secondary agriculture education programs at land grant universities are being transformed through new approaches to teaching and learning. These changes are being driven in part by the scholarly and practical work of faculty who are choosing to engage in pedagogical strategies that push the boundaries of the traditional teaching-centered norm. Specifically, faculty are participating in collaborative and interdisciplinary work that is creating opportunities to enhance student learning through experiential and civically-engaged curricula. One important contribution to this movement is known as Sustainable Agriculture Education (SAE), which is further explored through literature reports as a viable approach to learning through experience. This chapter will explore a selected diversity in literature to form a breadth of understanding to illustrate the complexity of the case of inquiry for this study. Historical perspectives of the land grant university mission lend insight to understanding sustainable agriculture education.

The Land Grant University: Historical Engagement and Sustaining the Mission

Historically, the mission of Land Grant Universities (LGUs) was to address and solve everyday problems in society by preparing students for a democratic citizenship (Colasanti, Reau, & Wright, 2009). The Morrill Act of 1862 appropriated federal lands to endow at least one college in every state, whose mission was to steer education away from the liberal arts and in the direction of the applied professions of agriculture, science, and engineering (Peters, 2006).

According to Peters, the LGU system (which includes Cooperative Extension and Experiment Stations) is being asked to re-conceptualize this now 151 year-old tradition—in part defined by the work of Liberty Hyde Bailey (1908), who asserted that the LGU mission should first and foremost be one of service to the citizenry. Historically the land grant's third mission of service/outreach/extension has undergone dramatic change since the first institutions of the 1800's (Roper & Hirth, 2005). The roots of the third mission, establishing service to community, experienced a paradigm shift in the 1950's toward research then again in the late twentieth century toward a one directional approach to service (Roper & Hirth, 2005). The mission of service is currently undergoing a fourth transformation blending the original understanding with new emphasis on relationships and mutual benefits regarding interactions between the university and community (Roper & Hirth, 2005). The National Academies of Science (2009) have called for a scholarship of civic engagement where academic knowledge and community service connect and contribute to community well-being in the form of service-learning. As an illustration of the “re-invented” LGU mission of engaged scholarship, service-learning represents one means of enhancing a new type of education for the people.

Because the views of faculty and administrators toward the LGU mission are in flux, Peters (2010) recently provided some insights into the dichotomy of views still held today. Taking a historical look at the democratic participation and civic engagement of faculty, Peters reviewed the call for professionalism spurred in 1915 by the American Association of University Professors (AAUP) as promulgated in their *Report of the Committee on Academic Freedom and Tenure*. This document argued that the “ordinary” institution was “established on behalf of the public in order to advance knowledge by the unrestricted research and unfettered discussion of impartial investigators” (Peters, p. 21). Thus, the role of any scholar is not to dictate to the

public, but rather to serve and inform the public with academic trustworthiness via publications and presentations. The role of the professoriate was also influenced by the reward system that followed political and fiscal influences on the university toward research (Roper & Hirth, 2005.) “These movements toward research, peer review, autonomy, and publication as indicators of academic success shifted the balance of faculty work to a preoccupation on research and discipline-based work, at all expenses of teaching and service” (Roper & Hirth, p. 8, 2005). Exploring the social role scholars serve in a democratic society also raised questions about how the scholarly knowledge should be used. For example, should knowledge be reported to the public in its unfiltered form, or should the scholars interpret findings and relate knowledge as they see fit—these were prevalent problems in the 19th century academia that continue to challenge scholars (Peters).

Peters (2010) characterized two opposing roles for scholars in academia: as service intellectuals or as purposivists. The service intellectual adheres to the civic function of the researcher to share scientific knowledge, technical expertise, and technology with the greater public in an unbiased one-way transmission. In another philosophical camp are the purposivists, which include two types—the public intellectual and the action researcher/public scholar/educational organizer. Purposivists reject the dualism of scholar and citizen; they do not agree that the service intellectual must serve the public as an unbiased supplier of the truth. In contrast, the public intellectual embraces the roles of expert, civic educator, and social critic; they view themselves as “engaging in conscious acts of political intervention aimed at advancing particular interests and ends” (Peters, p. 32). The other type of purposivist, the action researcher/public scholar/educational organizer, takes on a proactive and formative role while

conducting public work directly *with* specific groups of people as collaborators, directly engaging in civic life (Peters).

Peters (2010) argues for the idea that LGUs have a longstanding tradition of upholding a democratic purposivist tradition of scholarly civic engagement, instead of the service intellectual and oppressive views that can characterize these institutions. In the historical organization of LGUs—which consists of the academic institution, its experiment stations, and the cooperative extension service—the original role of the extension agent was not to disseminate the scientific knowledge of the institution, but rather to fill the role of educator and community organizer in order to create behavioral and social change (Peters). The LGU espoused, in practice, a variation of technocratic and democratic purposivist characteristics during the 19th and 20th centuries. Liberty Hyde Bailey encouraged an “enhancement of agricultural productivity, economic prosperity and material comfort, but also of deep civic, cultural, moral, environmental, and spiritual vitality and integrity” (Peters, p. 40). Moreover, Bailey asserted that faculty at LGUs had an obligation to connect their scholarship with this land grant mission. Sandmann (2008) emphasized the transition of engagement from an individual endeavor of the professoriate to a level of institutional engagement. This transition has been recognized as a change in culture, and Sandmann (2008) cautions that change toward engaged campuses must be supported by the faculty reward system and administrative structures. Thus, the historical mission of the LGU, coupled with the different views of democratic participation in higher education has spurred the ongoing discourse on civic engagement in higher education. Sandmann (2008) constructed a history of the evolution of engagement in higher education, thus confirming the argument for an expansion on the traditional understanding of service as a one way transmission of knowledge, embracing bidirectional interactions. This is historically impacted through the work of Boyer

(1996) in his seminal article, *The Scholarship of Engagement*, emphasizing the call for a partnership between the university and community as a two way interaction.

As noted in the introduction, the genesis of the land grant represented a pivotal change in the progress of higher education. Not too many years prior to the Morrill Act, a college education was an experience for the economically privileged classes. Thus, LGUs essentially made a practical education possible for anybody with the desire to seek it out. In contrast to the traditional educational model (Parr et al., 2007); the practical and *new* curriculum supported by LGUs was based on experiential learning, later emphasized by John Dewey and Liberty Hyde Bailey. Throughout the development of LGUs, research transitioned toward a discipline-specific structure where advances in techno-scientific knowledge created disciplinary specializations observed in LGUs today (Parr et al.). Some present-day educators are advocating a return to the traditional mission of the LGU—solving everyday problems and preparing students for democratic citizenship through education, research, and extension. According to recent scholarship, an essential component of this goal is the development of curricula that bridge theory to practice utilizing experiential fieldwork opportunities for a practical education (Colasanti, Reau, & Wright, 2009; Parr et al.).

Post–Secondary Agriculture Education

The Call for a Civic Education

Civic, as defined by DeLind and Bingen (2007), is the concept of belonging...to all people as inhabitants of places. It emerges from lived experiences, shifting relationships, and common cause. It is the culture of shared understandings and responsibilities. It is not agreement, or sameness, or personal comfort; rather it is bound into democratic process and engagement” (p. 129). Thus, any curriculum that builds upon a civic approach to learning has

the capacity to enhance the individual and collective experiences of faculty, community-partners, and students. Despite this potential, the importance of a civic learning component in college curricula—as opposed to the current model of focusing on the knowledge competencies desired by disciplines—is an area of scholarship that has been largely ignored.

In their book, “Preparing America’s Undergraduates for Lives of Moral and Civic Responsibility,” Colby et al. (2003) lamented the lack of personal and societal accountability in America:

The consequences of this cultural climate include a growing sense that Americans are not responsible for or accountable to each other; a decline in civility, mutual respect, and tolerance; and the preeminence of self-interest and individual preference over concern for the common good. (p. 7)

Colby and colleagues suggested that shifts in higher education have hindered the development of a civic undergraduate education. The researchers went on to describe the goal of higher education as developing civic maturity in three capacities: moral and civic understanding, moral and civic motivation, and moral and civic identity. This maturity is developed principally through civic engagement and participation. Important to note, however, is that civic participation alone is not a measure of civic engagement or learning. Viable civic learning opportunities occur when participants gain access to local organizations where community and social issues are engaged informally through meaningful situations. The role of the educator in higher education programs/courses to create opportunities for civic learning that connects to students’ conceptions of activities, lifestyle, and commitments.

Scholarship of Engagement

One important way of fostering a civically and politically engaged and socially responsible undergraduate is through service-learning and volunteerism opportunities that result in true educational engagement (Strand, Marullo, Cutforth, Stoecker, & Donohue, 2003). Similarly, Butin (2010) described an ideal *scholarship of engagement* reflecting the mission and/or vision of universities, with service-learning and/or community engagement being everyday threads to faculty-student interactions. Engagement is an essential component to sustainable agriculture curriculum. Connecting students, faculty, and community together in a mutually beneficial learning process and providing, “an opportunity for all, faculty, staff, students, and public, to learn together in seeking solutions to real problems” (Byrne, 2000, p.17).

Scholarship of engagement is a movement in academia toward revitalizing teaching, research, and service (Austin, 2010). Votruba (2010) emphasized the important role of engagement in higher education; in fact, the researcher suggested that engagement should be institutionalized as a core area of academic concern the same way that research and scholarship are prioritized. Glass and Fitzgerald (2010) listed three qualities that should be inherent in an engaged campus and in engaged scholarship overall: 1) engagement must have a scholarly goal with resulting knowledge benefiting both academia and society; 2) engagement should cut across the mission of teaching, research and service and cannot be separated from the core mission of institutions; and 3) engagement should be reciprocal, mutually beneficial, and represent a systematic relationship between university and community partners. The researchers were also quite specific in the likely positive benefits of an engaged campus:

Engagement is the partnership of university knowledge and resources with those of the public and private sectors to enrich scholarship, research, and creative

activity; enhance curriculum, teaching, and learning; prepare educated, engaged citizens; strengthen democratic values and civic responsibility; address critical societal issues; and contribute to the public good. (Glass & Fitzgerald, p. 15)

In other words, engaged scholarship should focus on connecting the intellectual assets of the institution to public service through community development, with faculty expertise fulfilling the institutional mission (Glass & Fitzgerald, 2010).

“The civic community perspective maintains that locally-oriented capitalism and civic engagement are the foundations of civic institutions that nurture trust and cooperation among citizens” (Tolbert, Irwin, Lyson, & Nucci, 2002, p. 92). Reciprocity and mutual benefit between the university and community are essential for building civic community/university engagement. Community members engaged in research and education as *community intellectuals* enhance the engagement of campuses by embedding grassroots knowledge and practice into curricula (Wynne, 2006). Establishing trust, respect, and appreciation between faculty, students, and community-partners foster social relationships that are mutually beneficial. These academic-community partnerships have the potential to enhance academic scholarship via the development of civically-engaged curricula. Moreover, thriving communities have the capacity to problem-solve and make decisions to benefit the whole and create civic well-being.

Experiential Learning Theory and Practice

Experiential Learning (EL) can be considered as both a means for understanding the process of learning and as an alternative pedagogy in adult and higher education, which is grounded in a diversity of learning theory perspectives. These theories represent a useful lens through which to view the process of learning that occurs as a result of experience. Michelson (1996) argued that experiential learning is “a socially constructed knowledge of the world, rather

than an internalized developmental process [and that] theories of ‘experiential learning’ are theories of knowledge, not cognition: in other words, epistemologies” (p. 185).

Two very different and overarching views toward experiential learning stem from modernist and post-modernist thought. The modernist view presents a narrative of detachment where the relationship between experience and knowledge is a distinct process and the construction of knowledge occurs after experience; such a view gives space for the abstract universalized knowledge that has become accepted by the traditional academy (Michelson). In contrast, the post-modernist viewpoint suggests that experience is not transparent, but mediated by social and historical interactions, where experience and knowledge form a reciprocal relationship (Michelson). The same type of reciprocal relationship shared between experience and knowledge can be extrapolated to the relationship between the individual and the larger society. In short, individuals shape society and society shapes individuals. How an individual views reality affects his or her perception of learning. Post-modernism assumes that one’s perspective is constructed through social interaction and language. Transitioning from the meta-narrative of modernism to a decentralized local narrative restores the value in stories and meaning that is continuously constructed through interactions within everyday life (Kvale, 1995). .

Through the lens of discourse analysis (Gee, 2011), social groups, cultures, and institutions are sustained and given meaning through the language-in-use. Language is used to engage with and build things that exist in our world; language use also gives meaning to experiential learning. In an earlier publication, Usher (1997) noted that “Experiential learning has become central to the theory and practice of education in the post-modern moment, as a pedagogy it is inherently ambivalent and capable of many significations” (p. 169). Discourse

varies in the meaning given to experience and significance lent to learning from this experience (Usher, 1997). Usher (2009) later stated the following: “As a pedagogy, experiential learning has the capacity to unsettle the established order and hence has a transformative potential” (p. 175).

One early proponent of experiential learning was Eduard Lindeman (1926), who promoted four key beliefs with respect to adult education: 1) learning is an everyday experience, 2) learning is driven by the whole of life, 3) learning is based on actual experience, and 4) experience is a resource of highest value. However, the basis for understanding experiential learning can be found in the historical works of John Dewey (1938), who argued that students do best in an environment where they are encouraged to experience and interact with the curriculum. His “learning-by-doing” philosophy is the foundation for hands-on experience in educational settings. Some decades later, Malcolm Knowles (1970) emphasized a learner-centered approach to experiential learning by shifting the role of the educator to one of a facilitator. A more recent voice in the experiential learning movement is Kolb (1984), who suggested that learning happens when “meaning-making” occurs as a result of experience. This cycle of meaning-making that forms the Kolbian experiential learning process consists of concrete experiences, reflecting on those experiences, conceptualizing, and experimentation.

One can see connections in the literature between those schools of thought—between the meaning of learning and the use of experiential learning as both process and pedagogical practice. Fenwick (2003) addressed some of these differences as tending “to center on understanding the relations between individual, situation, society, and environment in experiential learning, the nature of mind in action, and the ethical role of the educator” (p. 103). While tensions between and among viewpoints do exist, Fenwick (2003) stressed the importance

of maintaining the emergent roles of educator and student, while at the same time extending the active roles of educator and student to stakeholders outside the academy. Experiential learning as applied to an SAE orientation is based on Fenwick's (2000) definition of experience:

What manner of learning can be conceived that is not experiential, whether the context be clearly educational or not? Experience embraces reflective as well as kinesthetic activity, conscious and unconscious dynamics, and all manner of interactions among subjects, texts, and contexts. Experience flows across arbitrary denominations of formal and informal education, private and public sites of learning, and compliant and resistant meaning formation. If the category of experiential learning signifies non-schooled learning, then control and educators' presence are being reified as classifying dimensions. This creates a logical problem because educators created the category and thus are ipso facto, present in it. In any case, the category implies that some kinds of learning do not incorporate experience, which is an absurd proposition from any definitional viewpoint (pp. 244-245).

Also important to note is that experiential learning occurring on a community level is a likely outcome of service-learning practices. Support of an important tenet of the land grant university mission—namely, fostering community development through experiences that are mutually beneficial—can be achieved through service-learning programs.

Engagement through Sustainable Agriculture Education

The inclusion of civic engagement practices in sustainable agriculture education enhances the experiential learning process through the practice of service-learning. In fact, The National Academies of Science (2009) called for increased scholarship of civic engagement, wherein

academic knowledge and community service connect, thereby contributing to community well-being. Civic engagement, measures of civic embeddedness, relational ties among institutions, social capital, and trust are qualities exemplified by engaged communities (Tolbert et al, 2002). In keeping with Colby et al., LGUs need to reengage with their local communities in more meaningful ways by connecting the social with academic goals, knowledge competencies with personal commitment, and the university with the larger world.

Calls for reengagement and changes in agriculture education and LGUs have been increasing over the past two decades (Boyer, 1998; Kellogg, 1999; National Academies of Science, 2009; National Research Council, 1996). The Boyer Commission (1998) focused on the imbalance between teaching and research, the prevalence of didactic teaching and learning strategies, and the overspecialization of departments. In fact, Colby et al. (2003) suggested that a shift in higher education has hindered the development of a civic undergraduate education, stating that:

The Boyer (1987) report pointed out, as well as some others: the strong departmental focus of colleges and universities, faculty reward systems that place relatively little emphasis on teaching relative to research, the structure of the undergraduate curriculum, the separation between academic and student life, and accommodations to market forces resulting in the commodification of higher education. (p. 25)

Instead, the Boyer report called for a change toward an integrated approach to teaching and learning through interdisciplinary and collaborative methods. Expanding on the work of the Boyer Commission, the Kellogg Commission (1999) advocated a model for state and land grant universities that went beyond the traditional mission. Similarly, the National Research Council (1996) described the weaknesses of LGUs, calling attention to the need to expand current

understanding of the increasingly complex agrofood system with the goal of removing discipline-specific barriers. Addressing these weaknesses calls for the implementation of an interdisciplinary and collaborative approach to research and teaching (National Research Council, 1996).

Sustainable agriculture education provides a framework for addressing these weaknesses in LGU colleges of agriculture through experiential learning that emphasizes community engagement (Clark, Byker, Niewolny, Helms, 2013; Niewolny et al., 2012). Integrating the civic mission through applied learning and engaged scholarship is a means of enhancing and extending undergraduate curriculum in higher education, which represents the tenets of SAE. Goals for student learning in the context of civic education are based on fundamental values where the individual sees him or herself as a part of a larger social community who, when confronted by complex problems, engages in decision-making and action to address them. A holistic approach to education where the student is developed into an “accountable individual and engaged participant in society-local, state, national, and global” is an aspect of civic learning that can and should be addressed in higher education (Colby et al., 2003, p. 18). The learning that is possible in this integrated model can be fostered by programs, organizations, and curriculum embedded in higher education and promoted through interdisciplinary programs and educational opportunities.

Civic Agriculture as Civic Pedagogy

Civic agriculture is a term that academics, practitioners, and community stakeholders use to incorporate a wide array of grass roots efforts to connect *local* and *civic* agricultural initiatives (DeLind & Bingen). Lyson (2004) first crafted the term to describe a rebirth of local agriculture and food production, as reflected in the growing prevalence of farmers’ markets, CSAs

(community supported agriculture), and community gardens. Community engagement in these venues creates relationships and connects the citizen consumer with farmers. Civic agriculture is an alternative form of agriculture that challenges industrialized agriculture production methods. It supports rural economic development by supporting small/mid-scale farmers through direct marketing and availability of fresh local foods to a geographic region (DeLind & Bingen, 2007). Civic agriculture calls for decentralization of the food system and an emphasis on concepts of diversity and seasonality. This emerging paradigm in agriculture supports the SAE movement in higher education by emphasizing community-based learning opportunities and experiential approaches to engaged campuses. Niewolny et al. (2012) suggest that civic agriculture as a development paradigm can be applied to educational frameworks in support of a “conceptual groundwork for developing [sustainable agriculture] education that aims to strengthen students’ understanding of the connections among food, agriculture, and the community” (p. 4).

One of the results of globalization is that large multinational corporations have standardized and mass marketed a wide variety of food products, thereby changing the landscape of food systems so that no region is fully self-contained in terms of its food production or consumption (Lyson, 2004). Lyson argued for a more socially- and environmentally-integrated food system by rebuilding relationships between consumers and farmers, which has the potential for creating a foundation for community engagement in the local food system. The growing need for an increase in global food production, with an emphasis on standardizing systems of food production, has forced land grant universities to confront these challenges with new technologies and specializations. In particular, the increasing diversity of academic programs targeting the agricultural industry has emphasized the mechanical, chemical, and biotechnology revolutions in agricultural production methods (Lyson).

Indeed, as Lyson (2004) stressed, current agricultural practices need to be evaluated to ensure that opportunities for civic agriculture are engaged in the local economy and benefitting the social, environmental, and economic vitality of the local community.

At a local level, the civic community is one in which residents are bound to a place by a plethora of local institutions and organizations. Business enterprises are embedded in institutional and organizational networks. And the community, not the corporation, is the source of personal identity, the topic of social discourse, and the foundation for social cohesion. (Lyson, p. 69).

Sustainable Agriculture Education: Pedagogical Practice and Role of the Educator

SAE curricula as experiential, interdisciplinary, and community-based brings to light the need for understanding the pedagogical practice and role of the educator. Hence, the role of faculty in higher education has increasingly come under scrutiny, most notably through the work of Ernest Boyer (1996) and the Kellogg Commission (1999). Specifically, the nature of the role of faculty working at LGUs who, in theory, should be embracing the institutional mission of teaching, research, and extension, is sometimes murky. Certainly, the culture of the institution influences how faculty engage in their work, while the administrative organization functioning as a steering mechanism. Based on Boyer (1996), the Kellogg Commission (1999) called for a renewal of institutions of higher education through engagement, and by redesigning the “teaching, learning, and extension and service functions to become even more sympathetically and productively involved with their communities, however community may be defined” (p. 9). This scholarship of engagement, as defined by Boyer (1996), should connect “the university to our most pressing social, civic, and ethical problems” (p.19). Unfortunately, university tenure

and reward systems tend not to favor faculty who engage in service work with the community outside the walls of the institution (Vogelgesang, Denson, & Jayakumar, 2010).

In comparison to certain other disciplines, colleges of agriculture and life sciences—and the faculty who teach there—are obligated to keep up with advances in the techno-scientific knowledge base and shifting societal needs. How do such shifts affect the role of faculty in the classroom? In addition to a changing agricultural society, the scholarship of teaching and learning in higher education is moving toward a more student-centered pedagogy. Based on the work of a number of scholars who have studied sustainable agriculture education, faculty are implementing a social constructivist pedagogy that is experiential based (Clark, Byker, Niewolny, & Helms, 2013; Hammer, 2004; Parr et al., 2007; Parr & Van Horn, 2006; Roberts & Ball, 2009). One key aspect to the classroom experience in a learner-centered environment is engagement—“a move from a passive to an active learning environment” (Jungst, Licklider & Wiersema, 2003, p. 70). With this shift in pedagogy, an agriculture and life sciences faculty member is obliged to educate in a different manner. Importantly, lectures are substituted and/or enhanced through use of dialogue-based methods; in other words, the traditional teacher-centered environment transitions toward a more learner-centered environment. This increasingly relevant approach to pedagogical practice results in the role of educator resembling that of a facilitator and active participant in the learning. Halpern and Hakel (2003) stressed the importance of the “science of learning,” ultimately concluding that it is not what educators do in their courses that matters—but instead, what is asked of students to do. Principles for retention and transfer of knowledge that are applicable to SAE curricula are practice increases retention, value of prior knowledge and experience, balance of quantity and quality of content, and what learners do enhances knowledge retention (Halpern & Hakel, 2003).

Situated Learning and Service-Learning: Bridging Theory to Practice

Situated learning emphasizes social interactions and authentic learning. In other words, “situated learners” learn from tasks that parallel real-world applications. In that sense, situated learning parallels experiential learning because it directly engages the student in the phenomena being studied. Service-learning has been incorporated in higher education to invigorate community engagement and civic education. This approach to experiential learning stresses the social interactions of groups of people and learning; in contrast, the constructivist view of experiential learning advocates meaning-making through personal reflections based on concrete experiences (Fenwick, 2003).

According to Kendall (1990) “Service-learning programs emphasize the accomplishment of tasks which meet human needs, in combination with conscious educational growth” (p. 40). The addition of service-learning in an experiential learning course has the potential to “informalize” a formal learning environment (institutional classroom setting), thereby enhancing the students’ learning experience. Ward and Moore (2010) recently described a continuum of service-learning in terms of who directly benefits from the activity. On the one end is volunteerism where the receiver of the service benefits; on the other end of the spectrum is the student internship concept where student learning is the main benefit; in the middle of this continuum is service-learning where both the community partner and the student benefit from the learning experience. According to Butin (2010), however, the benefits to the receiver of a service-learning endeavor remains poorly documented. This represents an area where further exploration is needed—evaluating the learning that is happening within the community involved in a service-learning curriculum.

Non-formal education approaches—for example, situating a student as an apprentice learner through lengthy service-learning projects within the local community—is becoming a widely used pedagogy in higher education (Jacoby, 2006). A praxis of connecting academia with community engagement “within a framework of respect, reciprocity, relevance, and reflection” (Butin, 2010, p. xiv) represents an increasingly important movement toward engagement in higher education. It should be noted, however, that some ambiguity exists as to how service-learning is defined and how it should be practiced in the higher education arena. However, uncertainty can also lead to a renewed opportunity to define what a model of service-learning would look like through the lens of engaged scholarship. Despite any uncertainty as to how service-learning is defined for different practices, Butin (2010) asserted that the activity must first and foremost be legitimate, ethical, and useful.

Duncan and Kopperund (2002) stated that all service-learning must occur within a meaningful community-based setting to become meaningful to the students participating in the program. The researchers further defined three essential criteria for service-learning: (1) it must promote learning and academic rigor; (2) it must require the student to engage in reflective thinking; and (3) it must advance a student’s sense of civic responsibility—in other words, service-learning must prepare students to be responsible adults while being civically engaged within their communities. Also important is the application of knowledge learned within classroom walls to the real world so that “*thinking that leads to action*” (Duncan & Kopperund, p. 44). This action can be defined in criteria for levels of engagement of a citizen. Incorporating the practice of service-learning into curricula also identifies problems in education addressed by Rogers (2004), being that “espoused theory is what we *say* we are doing, often with complete faith in our ability to fulfill these aims and ambitions. Theory in use is what in fact underpins the

actions which we take, what we actually *do*. There is frequently a considerable gap between these two theories” (p. 6).

The praxis of incorporating a service-learning component in an experiential learning courses bridges theory with practice. It engages students in real-world problem solving for the benefit of the local community, while at the same time connecting knowledge gained in the classroom through readings, discussion, and other learning activities. Within the service-learning practice, the importance of understanding the objectives and desired outcomes of the learning activity cannot be overstated. The facilitator and student must be able to clearly define steps that need to be taken to achieve the desired goal, realize the results from the service, and measure the outcomes to assess student learning and community benefits (Duncan & Kopperund, 2010). Some student perspectives on successful learning approaches reported by Parr & Trexler (2011) have suggested that (1) theory and practice must be integrated into a course and related fieldwork, (2) learner-centered activities should incorporate peer-to-peer social relations, and (3) student learning is enhanced with facilitation and mentoring as instructional methods are imbedded in the service-learning activity.

Sociocultural Orientations Toward Experience and Knowledge

The sociocultural learning tradition spans early work on cognition (Piaget, 1995) to specific activities in context where historical and cultural aspects of the learning process are identified (Lave & Wenger, 1991; Lattuca, 2001). Also germane to this tradition is the work of Russian scholar, Lev Vygotsky, who is frequently positioned in a dialectic framework where language is emphasized in the knowledge construction process (Robbins, 1999). This dialectical emphasis on speech as a tool that reflects the external world (Vygotsky, 1978) is on learning through conversations both between two or more people and within one’s self. Vygotsky

influenced sociocultural learning by advocating the integration of social constructivism and situated learning, which has the potential to explain inter-relationships of social, cultural, historical, temporal, spatial, and cognitive aspects individuals learn within, as active agents. Social constructivism, as a branch of constructivist thought, is shaped in part by the amount of effect the individual and society have on the process of knowledge construction, while taking into consideration the impact of historical implications.

Monism, a Vygotskian approach to social constructivism, argues that “mind and body constitute a single reality in the functioning human being; therefore a single science must ultimately describe and explain the unity” (Robbins, 1999, p.vi). A Monistic approach to speech and action represents an interconnected process of lower and higher mental functions. This rejection of the Cartesian duality and emphasis on dialectic learning aligns with the guiding principles underlying experiential learning explored by Fenwick (2000, 2003). Vygotsky’s approach to learning and development (which accounts for higher mental function), also leads to addressing cultural history or a historical theory of higher mental functions (Vygotsky, 1999). Incorporating social and historical aspects of learning and development, Vygotsky created a framework for expanding constructivism to incorporate the effect the social world has on an individual through interactions.

Social constructivism goes only so far in negating the dichotomy of mind and body, as well as taking into account the social and historical influence the lived-in world has on the internalization of knowledge. In short, it leaves a vast expanse of learning construction to the individual mind. Lave and Wenger (1991) addressed three interpretations of Vygotskian constructivism. One such interpretation is the *scaffolding* of learning as representing the collaboration between the learner and a more knowledgeable individual, and a *societal* approach

where the distance between individual experience and a new collective understanding is explored. The view of learning focuses on experience and participation within continually changing environments; it views interrelationships, not just interactions, as continuously evolving occurrences. The unit of analysis is then transformed from the individual to the person-in-activity, navigating a mediated social world (Lave & Wenger, 1991). Lave and Wenger argued that learning is a “historical production, transformation, and change of persons... [where] participation is always based on situated negotiation and renegotiation of meaning in the world... [implying] understanding and experience are in constant interaction” (p. 51-52). Experience as learning through the lens of participation in a socially situated process again confirms the notion that learning should be an embodied activity. The unit of analysis when observing the learning process is still the individual—not just the cognition of the individual, but the individual and his or her experiences in the world through a socio-cultural understanding. Learning becomes situated in a specific place, as a kind of person, interacting with specific people with common social practices (Lave & Wenger, 1991).

Francis et al. (2011) created a summary of key elements involved in the learning process by drawing from Dewey (1938) and “critical learning systems,” where learners are situated in a learning landscape comprised of systems that influence the learning process. Elements necessary for this type of learning landscape are the following: (a) learning is a social and individual process; (b) knowledge and competencies must go beyond technical skills and involve experience in a broad capacity; (c) experiential learning occurs within community in the field; (d) service and community-based learning are guides for community engagement in learning; (e) teaching occurs in interdisciplinary teaching teams; (f) participants engage in practical models and complex problem solving via frequent and meaningful interactions; (g) pedagogy is a work

in progress; (h) evaluation is an integral and continuous part of curriculum development; and (i) intense educator involvement and resources are needed for success (Francis et al.).

The views of Francis et al. (2011) indicate that experiential learning should be a fluid process, where educators situate themselves in a more diverse composition of learning theory. An accord between multiple learning theories and alternative pedagogies can offer a solution to solving the complex problems facing higher education. A paradigm shift in higher education is experienced on a pedagogical level, where the classroom is transforming from instruction-centered to learning-centered. This shift from an instruction to learning paradigm is described by Barr and Tagg (1995), where institutions are being called upon to take responsibility for producing learning rather than simply providing instruction. The institution is now conceived as a learner in the system where change in how institutions produce learning is accomplished through constant assessment practices. However, the institution's administrative structure is where the lag exists with the organization giving credit to faculty and staff involved in alternative pedagogies that enhance experiential learning (Barr & Tagg). A gap is growing between what institutions of higher education currently provide and what students and faculty are demanding. Moreover, the scholarship of assessment and learning theory is shifting dramatically toward a learning paradigm; however, the existing organizational structures are still working within an instruction paradigm administration (Barr & Tagg). Nearly 20 years ago, Barr and Tagg called for higher education to create environments and experiences whereby students could become learners in their communities to solve complex problems. This learning paradigm, which can be seen as an emergent philosophy of higher education as well as pedagogical practices, suggests liberation from the traditional organizational structures of higher education. Instead, the shift toward experiential learning is responding to a call for restructuring and

reinvention where an assessment of student learning is based on the knowledge and skills gained both within the walls of the academy, as well as through meaningful community engagement.

This learning paradigm is based on an evolving pedagogical philosophy that implements alternative experiential approaches to learning. In a very pragmatic sense, it supports what works and in so doing recognized the need for continuous change. The roles of the educator, administrator, staff, and student start to blur in the learning paradigm, embracing the importance of multiple environments (local, national, international) in constructing educational experiences with an emphasis on collaboration (Barr & Tagg, 1995).

Experiential learning has deep ties to adult education. Fenwick and Tennant (2004) proposed three assumptions about adult learning intended to help educators develop more effective learning strategies: “1) no one theory of learning or of facilitating learning trumps the others [, 2)] learning is not a mental process occurring in a vacuum [, and 3)] the learner is not an object separable from the educator in teaching-learning situations” (p. 55). Additionally, Fenwick and Tennant suggested four categories for understanding multiple learning theories in adult education: 1) learning as acquisition, 2) learning as reflection, 3) practice-based community process, and 4) learning as embodied co-emergent process. When viewing learning through the lens of learning-as-acquisition, the focus is on cognitive processes, wherein the individual is the unit of analysis, acquired knowledge is both disciplinary content and the ability to continue to develop new knowledge as viewed by theories that focus on individuals conscious/schema and how experiences are interpreted based on prior experiences and shape future learning in experience. Theories that focus on learning as a reflective process view the individual as central, where meaning-making occurs through reflection of lived experiences, and where individual learners construct their own understanding of events. According to Fenwick and Tennant,

learning as a practice-based community process emphasizes both the context in which learning occurs, as well as how learning occurs through action. Legitimate participation is full participation in the learning community rather than learning about a specific practice where knowledge is directly related to action (Fenwick & Tennant, 2004). Within this third category, knowledge is not viewed as absolute truths, but rather what is relevant to the learner. Finally, learning as an embodied co-emergent process incorporates a systems approach to learning theories; in this model, cognition, identity, and environment co-emerge and the individual and context are inseparable (Fenwick & Tennant). A pedagogical approach to understanding this perspective is through conversation, where two differing ideas come together. The resulting perturbations that occur from this coupling create new understandings that would not have occurred in isolation (Fenwick & Tennant).

The overall purpose for identifying these different learning perspectives is to confirm that one discourse does not fully elucidate the nature of research and practice in adult and higher education. A shift from *theory into practice* toward *ourselves into practice* is called for by Fenwick and Tennant (2004), where theory-based knowledge is enhanced and augmented (or even discounted) through practice. The consensus of one single learning theory applied to adult education is “neither desirable nor possible...learning cannot be construed as a solely mental process existing within the mind of an individual, and that in a teaching-learning context any consideration of the learner must necessarily involve an understanding of the role of the teacher” (Fenwick & Tennant, p.73).

Concepts of reflection and transformation are two aspects of experiential learning that have been a source of consistent inquiry within adult and higher education. Reflection is an important step in the constructivist approach to experiential learning. Kolb (1984) described it as

a process whereby the learner first engages in an experience (actual or simulated), after which he or she reflects on the experience and forms an abstract conceptualization of it. In the final stage of the process, the learner engages in an experimental activity that tests the learned concept. Reflection is seen as an essential part of the cycle—if reflective time is not taken after an experience then learning does not occur (Kolb, 1984).

The concept of reflection was later emphasized by Schon (1987), who differentiated between *reflection in action* (reflection and action occur simultaneously), and *reflection on action* (when the learner reflects on the experience after the fact). Schon's assertion that reflection occurs both in action and after has implications for practitioners and researchers of experiential learning. As practitioners of experiential learning, the practice of incorporating reflection—either through discussion, written assignments such as journals and critical reflection responses, creative multimedia sources such as blogs, websites, or e-portfolios, in curriculum design—is of importance whether facilitating informal experiences in the field or in a formalized classroom environment.

The transformative potential of experiential learning is also a consideration when facilitating educational experiences, whether in informal adult education programs or formal higher education programs. Critical reflection, which surpasses the simplistic view of reflection in and on action, has been suggested as the pathway to transformative learning (Brookfield, 1987; Mezirow, 1991; Schon, 1987). Allowances for diversity in learning theories informing the process of experiential learning have gained value in the constructivist orientation toward adult and higher education. Understanding that critical reflection is necessary for connecting experience to knowledge in a meaningful manner will go far in reinforcing the educational experience. Brookfield described three stages in the process of critical reflection: 1) identifying

the assumptions of the learner, 2) creating a critical view of assumptions and their relationship to learner's experience, and 3) reorganizing assumptions to make them integrative of experience. Learners, through their desire to search for meaning in experience, will subject their beliefs to the transformative potential of critical reflection in the progress of self-development (Fenwick, 2003).

Furthering the concept of transformation through experiential learning, Mezirow (1991) also advocated the importance of critical reflection on experience as central to the formation and reformation of an individual's worldview. Mezirow's transformative learning theory has been a mainstay of scholars in the adult learning field. Three levels to critical reflection in transformative learning through experience are: 1) reflecting on content or what happened, 2) reflecting on the process, or how did it happen, and 3) reflecting on premises, or challenging assumptions (Fenwick, 2003). These three steps are essential in taking learners to a level where their own conscious and worldview can be transformed (Fenwick, 2003).

Experiential Learning in Sustainable Agriculture Education

Sustainable agriculture education (SAE) programs represent an emerging field in agriculture education, which incorporate experiential learning as a core component (Clark, Byker, Niewolny, & Helms, 2013; Grossman, Sherard, Prohn, Bradley, Goodell & Andrew, 2012; Hammer, 2004; Niewolny, et al., 2012; Parr & VanHorn, 2006; Parr et al., 2007). In fact, SAE typically implements alternative pedagogies and a philosophy of experience and knowledge that goes far beyond the traditional view of teaching and learning in undergraduate education programs. There are SAE programs in higher education based on this model that also incorporate a holistic approach to teaching and learning in an interdisciplinary and collaborative

capacity (Clark, Byker, Niewolny, & Helms, 2013; Hilimire, Gillon, McLaughlin, Dowd-Urbe & Monsen, 2014).

Experiential learning in SAE programs is changing the landscape of agriculture education programs and colleges of agriculture through a number of innovative practices, including student farms, internships, first year experiences, community-based learning experiences, service-learning, integrative labs, discussion-based teaching, and critical reflective writing within a dynamic curriculum. Parr and Van Horn (2006) investigated the theory and practice of sustainable and organic agriculture education programs and found that social constructivism frames our understanding of how to develop curriculum to meet the needs of an emerging SAE field. The researchers proposed seven guiding principles to explain the process of teaching and learning within SAE programs: 1) interdisciplinarity—integration of natural and social sciences; 2) experiential learning—learning tied to purposeful activity with integration of theory and practice; 3) systems thinking—holistic understanding of complex systems; 4) skills development—the fostering of practical and social skills; 5) linking the real world with the classroom—practices set in appropriate context and involving real-world problem solving; 6) community building—involving students, staff, and faculty in the endeavor; and 7) adaptive curriculum management—seeking constant feedback and changing the curriculum accordingly. Parr and Van Horn examined curricula needs in SAE by using a Delphi study to elucidate content knowledge, experiences, and skills necessary to prepare students for career integration. All three of these categories relate to experiential learning through integration of experiences through classroom content, fieldwork experiences, and skills gained through hands-on learning. Through experiential learning curriculum, students integrate lifelong learning capacity, attitudes and conscious awareness, and applicable skills “that are effective in the development of

sustainable agriculture” (Parr & Van Horn, p. 431). Further work in food systems education, focusing on student learning in community-based curricula emphasized the learning outcome of cultural competency training and outreach as necessary for student success learning within complex issues (Grossman et al., 2012). This aspect of student learning in sustainable agriculture education curricula should not be remiss from discussions related to curricula, assessment, and program design.

Other scholars have also supported the use of social constructivist learning theory in developing a transformative curriculum in food systems that incorporates learner-centered inquiry (Galt, Parr, Kim, Beckett, Lickter, & Ballard, 2012). Specifically, Galt et al. advocated the implementation of critically reflective research perspectives as necessary for building and enhancing curriculum. This approach to critical reflection in teaching and learning proposed by Schon (1983) and Brookfield (1995) provides a foundation for developing a teaching and learning scholarship in SAE that supports the shifting learning paradigm in higher education. In this model, course curriculum design in SAE incorporates a process of synthesizing learning competencies from multiple sources finalized with an iterative approach to the alignment of activities and syllabus to student learning objectives and outcomes (Galt et al.).

A sustainable agriculture curriculum focuses broadly on the environmental, social, and economic viability of the agrifood system. These dimensions represent the cornerstones of sustainability as a discourse. Parr and Trexler (2011) recently evaluated SAE programs and suggested that the most effective learning approaches shared certain commonalities: (1) they integrated theory and practice into coursework and fieldwork; (2) they incorporated learner-centered activities that emphasize peer-to-peer social relations, and (3) the use facilitation and mentoring as instructional methods. The researchers observed the use of experiential learning

theories in practice on school farms in SAE programs, “where horizontal co-construction of knowledge, rather than simply privileging faculty expert transmission” of knowledge occurred (Parr & Trexler, p. 178).

Despite the fact that the scholarship of experiential learning in SAE describes differing pedagogical approaches, disciplines, and learning theories, similar concepts are found embedded throughout the practice of SAE. These concepts stress the importance of hands-on experience, holistic views of teaching and learning, transformative change, and the importance of context/environment where learning occurs (Battisti & Passmore, 2008; Francis et al., 2011; Galt et al., 2012; Hammer, 2010; Parr & Trexler, 2011; Parr & Van Horn, 2006). Currently, faculty, staff, students and administrators at Virginia Tech are incorporating a scholarship of experiential learning, interdisciplinary curricula, and community engagement through an evolving degree program in Civic Agriculture & Food Systems at the Blacksburg, VA, campus.

Faculty Work as Learning through Practice

Sustainable agriculture education as a concept for innovative new degree and certificate programs in colleges of agriculture is incorporating alternative pedagogy that aligns with the shift toward a student-centered academy. Faculty teaching and learning in colleges of agriculture are participating in new and exciting ways. Incorporating alternative pedagogies, interdisciplinary teaching and research agendas, and community-based learning opportunities creates a need for the academy to pay close attention to faculty work as learning in every day practice. Over the past three decades, changes have been occurring in the academy—with particular advancements seen in the scholarship of teaching and learning (SoTL) and assessment. In order for institutions of higher education to fully engage in this shifting SoTL paradigm, a change in understanding the learning process and the desirable outcomes for both students and

faculty is necessary. This involves the development of a framework in higher education for understanding faculty work as a learning process—one that also values the challenges and benefits of conducting interdisciplinary collaborative research, teaching, and extension/service. The theory and practice of faculty work as learning is a framework that blends constructivist and sociocultural learning theories. It projects a holistic view of the learning process, distinctly incorporating an integration of interdisciplinary and collaborative practices. Faculty who work in collaboration with others in different disciplines have the opportunity to augment the interdisciplinarity of undergraduate degree programs to the benefit of both student and instructor. But given the increasing overlap of many academic programs, faculty working with a single discipline are also taking advantage of burgeoning opportunities for collaborative learning within disciplines.

According to Lattuca (2005), faculty learning positively impacts classroom engagement and effectiveness, as well as the larger scholarly community. “If learning is a prerequisite to teaching, research, and service, then higher education researchers and practitioners would be wise to understand the factors and contexts that promote and sustain faculty learning” (Lattuca, p.14). Faculty learning does not cease at the culmination of a PhD, instead it occurs daily with their interactions within scholarly literature and working with colleagues. Adult education literature overwhelmingly supports that adults learn through everyday experiences and are self-directed learners. Merriam, Caffarella, and Baumgartner (2007) wrote that adults learn in three different settings: “formal institutional settings, non-formal settings, and informal contexts” (p. 29). These settings can overlap and intentional blending can enhance educational experiences (Merriam et al.). Forrester and McTigue (2004) described workplace learning as a blending of professional development and informal and incidental (learning in action) learning. Faculty

work as learning occurs in an informal context in a self-directed manner, as everyday learning, and in formal settings—for example, as administration/departmental organized training/development opportunities. Lattuca (2005) described findings from exploring faculty engaged in interdisciplinary collaborative experiences that support the self-directed nature of faculty learning. According to the researcher, this process typically involves deciding on a topic, acknowledging the inadequacy of knowledge and/or methodological tools, and formulating a process to explore the topic further.

When faculty collaborate in professional settings through research, teaching, and extension/service projects, an instrumental framework is usually applied (Lattuca & Creamer, 2005). Faculty collaborate with others in their own discipline, as well as across disciplinary and institutional boundaries when instrumental needs such as the complexity of the project, efficient completion, and the benefit of products can be enhanced and/or expanded. The sharing of knowledge that occurs through collaboration and interdisciplinary teaching and research opportunities are learning environments in themselves. In addition to “sharing as learning,” the intellectual benefits that occur from collaborations across disciplines are extremely valuable to faculty work (Lattuca & Creamer, 2005). Refocusing on the learning that occurs during the everyday professional practice of faculty work can bring to light a more holistic view encompassing the “social interaction and relational dynamics at the center of practice” (Lattuca & Creamer, p. 5).

Neumann (2005) described five aspects of faculty work as learning: faculty work as knowing and learning; faculty learning as learning something; interdisciplinary practice as the subject of learning; context as content of learning; and object of collaboration as a unique problem. Faculty work as knowing and learning was further explained as acts of cognition

where doing “the work involves getting to know the work” (Neumann, p. 65). Faculty must engage in the existing scholarship and research in their particular area to advance knowledge in the field. Learning as learning something lends to the complexity of what is being learned and who is learning; emphasizing how learning is framed enables understanding of the process and experience (Neumann, 2005). Interdisciplinary practice as the subject of learning reveals the changing way that faculty interact with knowledge,

What a professor is learning is a knowledge practice, one perhaps already created by others, or being modified, or created anew-within a community of practitioners who have some shared view of what, together, they are up to in the name of practice. (Neumann, p. 71).

Faculty come to know their disciplines and professional practice by engaging within the context of department, college, institution, and discipline. Neumann also elaborated on collaboration to solve complex problems, where faculty learning can be facilitated through establishing a “well-defined, authentic problem, itself supradisciplinary (that is exceeding any one discipline’s purview)” (p. 77). The necessity for collaboration outside of one’s own knowledge can be a motivator for learning new concepts and applying them to existing frameworks to solve complex problems.

Akerlind (2005) reported on findings from a phenomenographic perspective by exploring the experiences of faculty in terms of their academic performance, personal learning, and disciplinary/social change. He suggested that the focus on faculty work should be rebalanced in order to promote their own growth and development, as well as to view their work within a more holistic framework. Specifically, Akerlind reported that faculty academic growth and development should occur along the following lines: (a) development as a productive/efficient

work; (b) development as achieving recognition/credibility; (c) development as improved quality and effectiveness; (d) development as personal knowledge and skill growth; (e) development as acquiring more in depth discipline knowledge; and (f) development as disciplinary growth and/or social change.

Sociocultural Learning Perspective of Faculty Work

Faculty work in contemporary academia typically involves engaging in books and journals, using internet resources, and attending professional conferences in order to interact with colleagues in a scholarly community (Lattuca, 2005). Although it might appear as a solitary activity, engaging in books and journals is a form of social interaction. In other words, the thoughts and ideas communicated by the author with a specific audience in mind, and the responses that are prompted, create a written discourse where ideas are developed and refined through intellectual collaboration. Whether one considers disciplinary or interdisciplinary communities of practice, the social nature of learning within faculty work is apparent. And while some social interactions in the learning process are more easily viewed as social in nature, they are also shaped by the economic, political, and cultural context in which they occur (Lattuca). Billett (2001) extends a sociocultural approach to adult learning in the workplace, emphasizing a product of participation in social practices as learning.

Lattuca and Creamer (2005) defined learning as “the personal or shared construction of knowledge... [where] learners are active participants in their worlds who seek to create personal meanings of their experiences” (p. 4). The researchers also viewed learners as being situated in nature, and interacting with interconnected contexts. Interdisciplinarity occurs on a continuum of activity. On one end is the “informal communication of ideas such as might occur in a conversation between colleagues from different disciplines; on the other end is formal

collaboration, such as research or teaching teams comprised of one or more faculty from different disciplines” (Lattuca, 2002, p. 712). Billett (2001) enhances this understanding of faculty work as learning through the lens of work place learning: “learning is an ongoing and inevitable process arising from participation...not only are learning and everyday thinking and acting irreducible, but what individuals learn is shaped by the kinds of activities in which individuals engage, and also the interactions...” (p. 3). A holistic view of faculty work as learning encompasses the social, cultural, and historical dimensions of sociocultural learning theory, thereby giving greater insight into what, how, and why we learn (Lattuca, 2005). Learning context is also widely encompassing to include the office, the department, the institution and the larger discipline (Lattuca, 2002).

The sociocultural approach to learning blends the individual and context in an encompassing sense, where interrelationships are critical to the process and outcomes of learning. Faculty learning is enhanced by interactions in a community or multiple communities through shared disciplines, professional organizations, departments, research centers, degree programs and organized social groups (e.g., teaching teams and collaborative research groups) (Lattuca & Creamer, 2005). A lens to understand faculty participation in interdisciplinary work is derived from Billett’s (2001) revelation of the tensions individuals experience in relation to motivation to participate and the ability afforded by the work place to participate. He proposes that the ability to participate is “constrained by the way workplaces afford opportunities for engagement and interactions” (Billett, 2001, p. 1). Lattuca and Creamer also called attention to the larger social contexts in which faculty engage as being influential for learning and methods of inquiry where “the kinds of questions we ask of the world are shaped by prevailing cultural conditions, practices, and beliefs” (p. 4). Lattuca (2002) described the sociocultural perspective

toward faculty work as learning as a starting point to view the relationships between “person and context, mediation, and apprenticeship and participation in communities of practice” (p. 714); he also proposed how these processes can enhance understanding of how faculty “create interdisciplinary approaches to research and teaching” (p. 714).

Faculty Work as Collaborative and Interdisciplinary Practice

As noted in the Introduction section, innovative faculty in colleges and departments of agriculture are working to promote SAE in a variety of ways. Specifically, the emerging field of sustainable agriculture education is creating opportunities for faculty work and enhanced professional practice via certificates, minors, and majors embedded in existing programs or by establishing new frameworks for undergraduate education. In agriculture education programs, interdisciplinary collaborations are recommended by the National Academies of Science (NAS, 2009). Francis et al. (2008) also argued for transdisciplinary learning in SAE research, where the integration of various disciplinary knowledge sources and methods can expand our understanding of the agrofood system. With an increasingly complex and interconnected global society, refocusing on the relationships between the natural and social sciences will help shape agriculture education and make it better able to address some of the following pressures suggested by the NAS report (2009): increasing global markets, concern for environmental impacts and health, redefining the scientific understanding of agriculture, consumer influence on agriculture, increased popularity of local and sustainable food, obesity as an epidemic, and changing demographics.

Interdisciplinary work requires the blending of different “disciplinary languages,” which Lattuca (2005) equated with: 1) an increase in fluency in disciplinary languages, 2) learning new methods of inquiry and new concepts and understanding of a phenomenon, 3) connecting with

different scholarly communities, and 4) enhancing practices and beliefs. Further, Lattuca found that when faculty respond to challenges to their own discipline-based beliefs and understandings, their professional identity and epistemological views shifted to the point where some “faculty members wondered if they still fit in their home disciplines” (p. 13).

Lattuca (2002) describes five components associated with how faculty work and learn: 1) substantive component, assumption and concepts of the discipline; 2) linguistic component, language that identifies and gives relationships to concepts; 3) syntactical component, organizing process; 4) value component, what should be studied and how; and 5) conjunctive component, discipline’s relation to other disciplines. Faculty learn how to work together through collaboration, developing “new ways to perceive and understand the phenomenon of interest to them” (Lattuca & Creamer, 2005). Collaboration amongst faculty within and across disciplines is defined by Lattuca and Creamer “as a social inquiry practice that promotes learning” (p. 5). Faculty learning through interdisciplinary collaboration is an area where further research is needed. Lattuca and Creamer asserted that faculty participating in interdisciplinary teaching gain new teaching strategies and insights, are intellectually stimulated, and are more reflective on both their own learning and their students learning (Lattuca, 2001; Thorburn, 1985). Kreber and Cranton (1997) established a tri-part framework for understanding faculty learning, which is built upon transformative learning, constructivist psychology, and critical social theory.

Academic disciplines, defined by Lattuca (2009) as cultures of shared knowledge and understanding, are more than just the subject matter and methodologies implemented in research and education.

They are social groupings of people who, to varying extents, share assumptions, behavior patterns, and beliefs about scholarship. The value judgments made by

individuals within a discipline concerning the appropriate topics for investigation, the kinds of questions that are valid to ask, and judgments regarding what constitutes a valid answer are social conventions, and these conventions lead to different views of scholarship (Lattuca, p. 34).

Traditional higher education structures segment knowledge into specific disciplines, as exemplified by the longstanding separation of the natural and social sciences. The danger of continuing to hang onto this model is that when we analyze the world in very small parts, we can lose an understanding the whole and how all of the pieces and parts interact (Lattuca, 2001). This discipline-specific culture in higher education can make it hard for membership in one discipline to merge with another. Godemann (2006) described the complexities of generating knowledge that can solve today's problems as requiring know-how that spans society and educational contexts and surpasses the scientific community and disciplinary methodology. For example, the traditionally-segmented disciplines within natural and social sciences exist, where problems are solved in *silos* and via techno-scientific expertise.

In contrast, interdisciplinarity mirrors a systems-based learning approach as it integrates various disciplinary knowledge sources in a holistic perspective of research and teaching. The term "interdisciplinary" can be better understood as "non-disciplinary" by faculty and administration in higher education in order to realize the notion of understanding the world through a holistic lens (Lattuca, 2001). Reconceptualizing interdisciplinarity as a mode of inquiry that relies on multiple knowledge perspectives and methods, as well as embodies activity within social interactions, furthers the definition. When viewing interdisciplinarity through a sociocultural lens, disciplines become cultural tools with individual thinking and activity influenced by the discipline in which the individual is situated (Lattuca, 2003). Here, the

separation of mind and body is emphasized in conceptualizing research and teaching in higher education.

Defining the four main classifications of research is important for establishing a foundation for effective interdisciplinary teaching and learning.

- 1) **Disciplinary Research:** Problem solving in specific disciplines
- 2) **Multidisciplinary Research:** Disciplines working separately to solve individual problems with their own methodology, connecting the results in the end.
- 3) **Interdisciplinary Research:** Common problems that span multiple disciplines where “new knowledge structures are established by the integration of different disciplinary perspectives theories and methods” (Godemann, 2006, p. 52). Faculty involved in interdisciplinary research and teaching reflect on their own and other disciplines gaining new knowledge and perspectives.
- 4) **Transdisciplinary Research:** Problem solving that involves incorporating expert knowledge outside of academia.

Important to note is the distinction between multi- and interdisciplinarity.

Multidisciplinarity takes into account multiple disciplinary perspectives but does not integrate these to create an interdisciplinary understanding of a problem (Zalanga, 2009).

As discussed above, a sociocultural approach stresses the importance of context as encompassing the social, cultural, and historical settings for teaching and learning (Lattuca, 2003). Approaching interdisciplinarity through a sociocultural lens leads to identifying disciplines as a cultural tool that can be used to advance scholarship through, for example, language and material artifacts. In other words, individual thinking and activity is influenced by

the discipline that the individual is situated in (Lattuca, 2003). Moreover, considering faculty work as learning through a sociocultural lens in a collaborative and interdisciplinary manner can create space for new approaches to research, teaching, and extension/service in higher education. Realizing the need for integration of academic knowledge in a flexible framework allow for connecting and reflecting one's own perspectives in the curriculum (Godemann, 2006). Enhancing curriculum in higher education through partnerships between institutions, colleges, governmental and non-governmental organizations, and community would be the first step toward an interdisciplinary education.

Scholarship of Teaching as Faculty Learning

The land grant mission, as well as many other private and public institutions of higher education, is rooted in teaching, research, and service. Teaching, as a focus, is now in a state of transition with faculty and administrative leadership seeking new and appropriate practice and understanding of students as learners and faculty as educators. Therefore, it is important to connect the role that the scholarship of teaching has on faculty development. Kreber (2001) defined the scholarship of teaching as “knowledge that can be shared with and reviewed by a community of peers, and be built on by members of this community” (p. 79). Kreber (2001) later described it as requiring both disciplinary knowledge and knowledge of how students learn—and by integrating these two concepts one can develop pedagogical content knowledge. Kreber advocated for the scholarship of teaching to be integrated into faculty development, stressing how knowledge is increased when faculty improve on teaching practices and insights. Kreber recommended five strategies for faculty development via the scholarship of teaching. The first recommendation is to “introduce department wide collaborative action research programs in which professors and faculty developers explore teaching and learning in the

discipline” (p. 81). This recommendation encourages learning by exploring a specific teaching and learning problem with the purpose of finding a solution to increase effectiveness. The second recommendation is to “allow faculty to contract for and focus on the scholarship of teaching...and allow for sabbaticals to be dedicated to the scholarship of teaching” (p. 82). This recommendation encourages faculty to engage in learning new approaches to teaching via greater institutional support. The third recommendation is to “base workshops and seminars on educational theory and research” (p. 82), which can serve as a starting point for faculty to seek new knowledge in a self-directed way. The fourth recommendation is to “establish department reading circles on teaching and learning and learning in the discipline, and encourage team teaching” (p. 82). This recommendation focuses on the learning that can occur through disciplinary/departmental collaboration in teaching and research, which can stimulate dialogue and “reflection and improvement of practice” (p. 82). The fifth recommendation is to “base courses on postsecondary teaching and learning on a model of the scholarship of teaching” (p. 83), focusing on learning how to teach through an established framework for the scholarship of teaching.

Kreber and Cranton (1997) constructed a model for the scholarship of teaching that focuses on three knowledge domains: instructional—content reflection (*the what*), pedagogical—process reflection (*the how*), and curricular—premise reflection (*the why*). These levels of reflection are applied in two ways: “First, to serve as a meaningful way of categorizing the various kinds of knowledge that faculty need, and second, to explain how faculty construct knowledge in each of these identified categories” (Kreber, 2001, p. 83). Understanding knowledge construction through a model for the scholarship of teaching, making teaching

knowledge explicit, evaluating effectiveness of teaching, and assessing the premise for teaching practices can be achieved (Kreber, 2001; Kreber & Cranton, 2000).

Facilitation of and Impediments to Faculty Learning

Based on Knowles (1980), Merriam, Cafferella, & Baumgartner (2007) summarized some important assumptions about adult learners: (a) an adult's self-concept transitions toward that of self-direction, (b), experience serves as a resource for learning, (c), social role is related to learning readiness, (d) immediate application of knowledge where learning is problem centered, (e), internal motivation toward learning; and (f) purpose of learning is needed, why should they learn. Faculty work as a practice of learning involves disciplinary knowledge and institutional norms as both mechanisms of facilitation and encumbrance. Lattuca and Creamer (2005) expanded upon the concept of faculty motivation toward facilitating faculty work and learning saying, "Faculty do what they think they are good at doing, devote energy to those things that interest them, and engage in activities in which they believe they can influence outcomes" (p. 7).

According to Lattuca and Creamer (2005), some known impediments to faculty learning include the general indifference of discipline-oriented departments, passive research management policies, a lack of financial resources, few accountability or assessment strategies, excessive faculty workloads, and a traditional university reward system based on quantitative measures. "The real impediment to interdisciplinarity is not academic departments but the attitudes, beliefs, and values of gatekeepers, such as editorial board members and reviewers who police disciplinary boundaries" (Lattuca & Creamer, p. 6). Lattuca and Creamer argued that "discipline[s] [are] the dominant force and the central source of identity for faculty members" (p. 6).

Neumann (2005) asserted that faculty learn continuously both tacitly and explicitly through their work, and that this learning plays an important role in professional identity formation and impact. “That a professor’s learning, realized or not, may be the most telling feature of what that professor can become, including the kinds of contributions that she or he will make to the university, students, and society” (Neumann, p. 81). Faculty work as pedagogic learning was also suggested by Zukas (2006) as a way to view faculty as being in “socially situated practice” (p.70). When considering faculty work as learning and viewing pedagogy as occurring beyond the classroom walls, “a much wider understanding of the arena and settings in which pedagogical practices develop and take place” (Zukas, p. 71). Malcolm and Zukas (2009) suggested that faculty identity is formed in the messy everyday life experiences in the workplace, where “discipline, research, pedagogy and academic identity appear to be inextricably entangled” (p. 498).

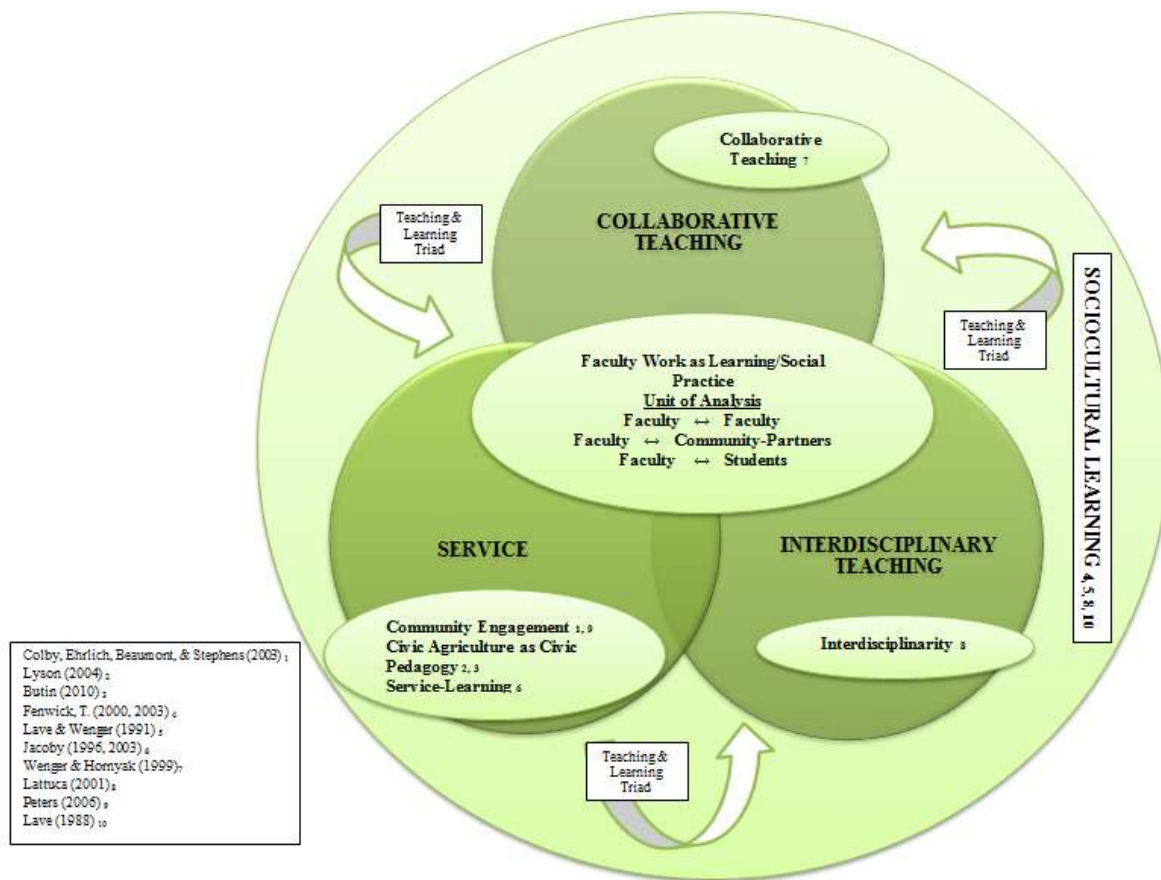
The intellectual outcomes that emerge when faculty engage in learning within collaborative interdisciplinary research, teaching, and extension/service is an area that can and should be incorporated into assessment measures. The value of professional practice development is already being acknowledged by institutions of higher education, some of which are explicitly giving credit to the types of faculty work that increase the knowledge and skills of faculty who use a more a holistic approach for addressing the pressing and complex social, economic, and environmental problems facing the world today.

Although the majority of the “faculty work as learning” scholarship revolves around the research and teaching aspects of professional practice in higher education, extension/service should not be ignored in the conversation. Austin and Beck (2010) advocated for a “scholarship of engagement” to be recognized by administration and faculty as necessary to connect the

institution's mission to its work and to broaden impacts on society. The authors proposed four strategies for achieving this goal all of which can be applied to the extension/service mission of the university: 1) increase faculty knowledge and skills regarding engagement and outreach through comprehensive development plans, 2) provide opportunities for participation in the scholarship of engagement, 3) align institutional reward structures for recognition, and 4) encourage an institutional culture of engagement (Austin & Beck). Incubating a culture of engagement throughout departments and colleges can change the attitudes and values of faculty work in collaborative interdisciplinary learning environments.

Figure 1.

Theoretical Framework



Summary of Theoretical Framework

The guiding research question in this study addressed learning through a sociocultural lens and was answered by four research questions. Following Fenwick's (2003) explanation of learning as a sociocultural experience, and Lattuca's (2001; 2002) orientation to "sociocultural learning theory," I explore and understand faculty work as learning to emphasize the importance of "cognition and the social activity embedded...through interactions with others, with the tools of different communities of practice, and in a variety of contexts" (Lattuca, 2002, p. 719). Specially, I draw upon Lattuca (2002) as a way to highlight how disciplinary positions frame faculty assumptions, practices, processes, values, and relations to other disciplinary perspectives in their everyday work. Therefore, in this case of faculty teaching and learning in a sustainable agriculture education curriculum, the unit of analysis is informed by faculty work as a sociocultural practice, drawing on the understanding of Lave (1988) that "the deep experience of whole-persons acting" (p. 190) illustrates the nature of experience coupled with person, activity, and setting as conditions for learning. The unit of analysis is, therefore, faculty teaching and learning in the CAFS minor embedded with collaborative, interdisciplinary, and service learning partnerships with CAFS faculty (faculty-faculty), community partners (faculty-community-partners), and student learners (faculty-student).

Each of the research questions draw upon a specific conceptual thread that together answers the overall research question. Research question one uses Lattuca's (2000, 2005) understanding of collaboration across disciplines as social inquiry practice that promotes learning. Here, collaboration is viewed as a practice in the study that faculty participate in. Lattuca (2002) describes five components associated with how faculty work and learn: 1) substantive component, assumption and concepts of the discipline; 2) linguistic component,

language that identifies and gives relationships to concepts; 3) syntactical component, organizing process; 4) value component, what should be studied and how; and 5) conjunctive component, discipline's relation to other disciplines. Faculty learn how to work together through collaboration, developing "new ways to perceive and understand the phenomenon of interest to them" (Lattuca & Creamer, 2005).

Research question two draws on Lattuca's (2001) understanding of faculty participating in interdisciplinary teaching. I therefore use interdisciplinary teaching as described as a sociocultural practice where faculty gain new teaching strategies and insights, are intellectually stimulated, and are more reflective on both their own learning and their students learning (Lattuca, 2001; Thorburn, 1985). When viewing interdisciplinarity through a sociocultural lens, disciplines become cultural tools with individual thinking and activity influenced by the discipline in which the individual is situated (Lattuca, 2003). Academic disciplines are cultures of shared knowledge and understanding (Lattuca, 2009).

Research question three draws upon the theoretical lineage of engagement (Duncan & Kopperund, 2002; Butin, 2010; Jacoby, 2007) where faculty participation in service is illustrated through community-university partnerships. Faculty who engage in service are espousing community engagement "within a framework of respect, reciprocity, relevance, and reflection" (Butin, 2010, p. xiv). Furthermore, the activity in service must be legitimate, ethical, and useful (Butin, 2010). Faculty participating in service-learning as a pedagogical practice should include three essential criteria: (1) it must promote learning and academic rigor; (2) it must require the student to engage in reflective thinking; and (3) it must advance a student's sense of civic responsibility.

Research question four is rooted in Peter's (2010) explanation of the role of faculty as scholar. Here I refer to three categories to give meaning to the way CAFS faculty perform as scholars: service intellectual, public intellectual, and the public scholar. I view the role of scholar as a rejection of dualism of scholar and citizen. In this study the public scholar takes on a proactive and formative role while conducting public work directly with specific groups of people as collaborators, directly engaging in civic life (Peters). This view illustrates an emerging change in the culture in higher education where engagement is valued, supported and rewarded through faculty and administrative structures (Sandmann, 2008).

This framework comes together to help explore the teaching and learning of faculty engaged in experiential-based sustainable agriculture education (SAE) curricula at a land grant university (LGU). Specifically, I sought to understand faculty work as learning through engagement with faculty, community-partners, and students. In doing so, I drew upon a sociocultural learning framework informed most notably by Fenwick (2000, 2003) and Lattuca (2002; 2001).

Conclusion

Faculty engaged in SAE program design, implementation, and assessment are transforming the workplace into a space for faculty learning—one that emphasizes the benefits of engaging in new fields of research, teaching, and extension/service via an interdisciplinary approach to scholarship. Calls for reengagement and change in higher education have escalated over the past two decades, some notable reports being the Boyer Commission (1998) “Reinventing Undergraduate Education: A Blueprint for America’s Research Universities”, the Kellogg Commission (1999) “Returning to Our Roots: The Engaged Institution”, and the National Academies of Science (2009) “Transforming Agriculture Education for a Changing

World.” Stakeholders in agriculture education programs at LGUs and elsewhere are increasingly promoting the value of experiential learning, interdisciplinary teaching and learning, and collaborative teaching and learning. This evolution can be seen in the recent expansion of SAE scholarship as reflected in new approaches to undergraduate agriculture education curriculum—one that incorporates sustainable, civic, and agroecological perspectives at the forefront of a changing agricultural landscape (Battisti, Passmore & Sipos, 2008; Francis et al., 2008; Francis et al., 2011; Galt et al., 2012; Jacobsen et al., 2012; Niewolny et al., 2012;). This change in learning is reflected in an increasing body of literature focusing on civic engagement and learning, sustainable, civic, and organic agriculture, community-university partnerships and service-learning.

CHAPTER 3

RESEARCH DESIGN AND METHODOLOGY

The purpose of this study was to explore the experience of faculty teaching and learning in experiential-based sustainable agriculture education (SAE) curricula at a land grant university (LGU). Specifically, I sought to understand faculty work as learning through engagement with faculty, community-partners, and students. In doing so, I drew upon a sociocultural learning framework informed by Fenwick (2000, 2003), Lave and Wenger (1991), and Lattuca (2001). First, Fenwick's (2000, 2003) understanding of experiential learning is expanded to abate the bifurcation of mind and body in the learning process—instead calling for an embodied approach to experience as learning. Lave and Wenger informed the learning process explored in this study through their advocacy of a situated learning orientation to learning with a focus on sociocultural factors. In their view, learning is fundamentally a social process and does not occur in isolation (i.e., in the learner's head); as such it includes mutually constitutive relationships among activity, agent, and the wider world. Lattuca offers a sociocultural approach to interdisciplinary teaching, scholarship, and research that enhances how faculty and community-partner work is perceived as an interdisciplinary practice. The role of service-learning (SL) in community-university partnerships is emphasized by Jacoby (2006). To that end, I evaluated the process of SL as a viable pedagogical practice to enhance experiential-based curricula in SAE at a single land grant university. Lastly, SAE is explored as an emerging solution to complex issues in the current agrofood system and catalyst toward revitalizing the LGU mission through innovative praxis.

Research Questions

In order to address the research objectives stated above, I utilized the single embedded case study framework informed by Yin (1997, 2012). This methodology guided the

development of the following overarching research question and the corresponding four sub-questions.

From the perspective of sociocultural learning, how do faculty learn within a sustainable agriculture education program at a land grant university?

1. How do faculty understand and participate in collaborative teaching?
2. How do faculty understand and participate in interdisciplinary teaching?
3. How do faculty understand and participate in service-learning as a pedagogical practice?
4. What are social outcomes relevant to the role of sustainable agriculture education faculty at a land grant university?

Ontological and Epistemological Positioning

Using a sociocultural learning framework, this study explores the manner in which learners interact with the learning environment in a sustainable agriculture curriculum at a land grant university in southwest Virginia. This study draws on an ontology and epistemology of relativism and social constructivism, respectively. Relativism transitions from empiricism toward “discovery and finding to those of constructing and making” (Smith & Hodkinson, 2008, p. 419). The relativist paradigm reflects knowledge, how knowledge originates, and the knower’s contribution to knowledge relative to the individual or a group of people. According to Gergen (1985), three assumptions inform this perspective: (1) knowledge is not generated by testing hypothesis, but by alternative meanings created through understanding experience, historically, culturally, and politically; (2) social artifacts are products of how the world is understood through persons in relationships; and (3) knowledge and understanding is sustained through the social processes of rhetoric. Pretty (1994) forms a view of alternative systems for

inquiry in sustainable agriculture—one that contradicts the positivist dominated Cartesian view of scientific investigation. Non-positivists (i.e., people subscribing to an alternative view of reality) do not reject scientific methodology; instead, they pose “a more honest way of thinking about science is as a human tool, not as a discipline that is in touch with some absolute reality” (Pretty, pp. 39-40). Movement away from this reductionist view is needed to elucidate complex systems and define *true* knowledge in a manner that recognizes multiple perspectives.

This perspective aligns with the epistemology of a constructivist tradition where subjectivity and relativism prevail...that truth is not absolute but interpreted by the knower. Packer (1999) further explains the Cartesian ontology as being a separation of mind from world, which contradicts the epistemological argument of Fenwick (2003), who argued against the modernist perspective that the mind and body are separated. Indeed, these authors call for a reconnection of mind/world and mind/body with the purpose of escaping the modernist tradition in academia. Lave and Wenger (1991) emphasized the socially-situated activity of being in the world by focusing on a change in identity; a learner constructs new knowledge that shapes new identity through “the historical production, transformation, and change of persons” (pp. 51-52). This study is grounded in the belief that a learner is able to construct new knowledge as a result of experiential interactions with the world, which in turn influence beliefs and shape values.

Berger and Luckman (1967) proposed a view of the reality of everyday life...

...that my natural attitude to this world corresponds to the natural attitude of others, that they also comprehend the objectifications by which this world is ordered, that they also organize this world around the here and now of their being in it and have projects for working in it. (p. 23).

Similarly, Packer (1999) discussed identity in relation to membership and participation in community:

To be human is to be split; to become a participant is to become divided...our activity produces a social world that defines who we are, but that world also confronts us as something alien. We become divided from ourselves, so that we need for us to find ourselves again. (p. 2).

This reciprocity between the individual and the lived-in social world visualizes how one's own identity must be embedded in the social world in which we interact. Human beings not only come to know reality socially through interactions with others, but also through interactions with themselves, thereby creating an understanding of our environment within one situation and applying that understanding to new situations (Charon, 2009). The use of both socio-cultural and constructivist perspectives facilitates the connection of mind/world and mind/body through a complementary kaleidoscope-like lens; it also accommodates both strengths and weaknesses and allows for gaps to be filled by other perspectives that might have fewer limitations within certain contexts.

Assessment in Higher Education: A Methodological Perspective

Assessment as a systematic approach to collecting and using evidence to determine the level of student achievement toward student learning outcomes—and thus using findings to improve quality and alignment of instruction—can be accomplished at the classroom, programmatic, and institutional levels (Judd & Keith, 2012). Accountability in higher education is a key motivating factor for the expansive increase in assessment of student learning and program effectiveness, implementing the use of formative and summative assessment processes (Judd & Keith). The scholarship of assessment is comprised of a diverse range of methodologies

and purpose, leading to a complex view of the field, which may account for some of the tensions arising across university faculty, administrators, and assessment professionals. Acknowledging significant variations in assessment methodology and purpose, it is important to clearly describe the framework for research design and involve all stakeholders in the process.

Given these differences in assessment methodologies, a rigorous research design—whether qualitative, quantitative, or mixed methods—is needed to generate applicable data that is beneficial to all stakeholders. Focusing on qualitative evaluation, for example, an assessment strategy should use real-life context, implement multiple approaches, and include a comprehensive research strategy (Pondish, 2012). Erlandson (2012) described the use of naturalistic inquiry in assessment, where the knower can never comprehend or come to know an objective reality, but attempts to understand and uncover the complexity and messiness in social structures and interrelations. Naturalistic researchers ask the question “what’s happening here?” begin with the context, then expand the meaning of the setting—but allow that the complexity is likely to be unsettling until a more accurate account of what is happening can be revealed. Erlandson also suggested methodologies for data collection with the purpose of capturing people’s stories. These include interviews, conversations, observations, and written artifacts where “little stories” merge into “large narratives” (p. 484). The benefit of this type of inquiry to institutions is to gain an understanding of the context that decision makers are working within (Erlandson). The quality of this approach is obtained through implementing “trustworthiness criteria,” discussed in the section on qualitative approaches, where credibility, transferability, dependability, and confirmability are standards that complement the positivistic approach to rigorous research design evaluation (Erlandson).

Furthering the discussion of quality in a naturalistic inquiry, the IRB process is stricter than the positivist view of research design, where the participants are noted as partners in the project, resulting in mutual benefit and value for both researcher and participant (Erlandson, 2012). This method of inquiry achieves the goal of authenticity through measurement criteria consisting of fairness, ontological authenticity, educative authenticity, catalytic authenticity, and tactical authenticity (Erlandson). Fairness refers to all stakeholders being involved in all stages of the research process at an equal level of access. Ontological authenticity, if met, should clarify the way in which an individual constructs knowledge of the world around them; it also addresses change in views. Educative authenticity is confirmed when participants gain greater understanding of a concept through the experience of another's knowledge construction. Catalytic authenticity is gained through participant actions and decisions being expanded. Tactical authenticity is measured through how participants act in their social environment to impact change. The additional viewpoint that participants in the research process are full partners, contribute to measures of authentic engagement and outcomes of participation.

“Research is inquiry, deliberate study, a seeking to understand” (Stake, 2010, p. 13). Considering assessment approaches to “good” research design calls to mind a well-known dichotomy that to a large extent is based on the researcher's disciplinary home and background: quantitative versus qualitative. Scientific inquiry is a way that researchers seek to explain how things work within physical, biological, and sociological phenomenon (Stake). Stake argued that qualitative and quantitative inquiry differ more by a measure of emphasis than distinction. Scientific research tends to be quantitative in nature, with an emphasis on linearity, measurable constructs, and implementing statistical analysis. However, it is also qualitative to some degree

because of the personal experiences, skepticism, and intuition that researchers bring, relying “primarily on human perception and understanding” (Stake, p. 11).

Qualitative Inquiry: Justification for Research Design

As noted above, quantitative and qualitative approaches are intended to accomplish different goals depending on the research design. Because the proposed study investigated a sociological phenomenon, a qualitative approach is appropriate in that the researcher is seeking to explain how things work in context and with specific people engaged in the experience. Careful attention was paid to underlying philosophical and epistemological beliefs affecting the overall research design and process. Additionally, the assumptions that researchers bring to their work, whether realized or not, impact the research design, questions asked, and the theories that guide and inform the study (Creswell, 2013).

The historical emergence of qualitative inquiry began in the 1920s within the fields of sociology and anthropology and the work of the *Chicago School*, which advanced the study of human disciplines and in so doing helped to redefine fieldwork as a method (Denzin & Lincoln, 2000). Half a century later, the landscape of qualitative inquiry changed as a movement due to criticism of conventional approaches to social science, which had been grounded in experimental and quantitative methodologies (Schwandt, 2000). Schwandt described three epistemological stances that qualitative researchers take toward inquiry: 1) interpretivist, 2) philosophical hermeneutics, and 3) social constructionism. When exploring the literature in qualitative inquiry, one often encounters the interpretivist and social constructivist perspectives combined (Creswell, 2009). Rossman and Rallis (2003) identified two key factors associated with a qualitative approach to research inquiry: 1) the purpose of the inquiry is to learn about the social world, and 2) the researcher is an integral part of the inquiry in that he/she interprets the results

and constructs resulting knowledge. This guides the interpretation of qualitative inquiry in this study. In summary, this study's methodology is framed through a blended understanding of qualitative inquiry informed by the works of Rossman and Rallis, which emphasizes an interpretivist orientation

Qualitative Inquiry: Defining Characteristics

Qualitative research, which is grounded in empiricism (knowledge being created through experience), is the preferred method for a study designed to elucidate the lived experiences of participants. A qualitative researcher will use one or more methods of data collection, including focus groups, in-depth interviews, and observation. Qualitative researchers take a holistic approach, continuously reflecting on their own perspectives and implementing inductive reasoning throughout the iterative process of data collection and analysis (Rossman & Rallis, 2003).

Stake (2010) listed important characteristics of qualitative inquiry: (a) it is interpretive—multiple meanings are made from different perspectives where the researcher is interacting with the phenomenon and unexpected outcomes are embraced; (b) it is experiential, participatory and naturalistic—experience is seen vicariously through the study and embraces an ontological view that reality is a human construction; (c) it is situational—it emphasizes context and uniqueness of time and place, forgoes generalizability, implements holistic approach, and is detail specific; (d) it is personalistic, understanding of perceptions and empathy, diversity and uniqueness is encouraged, is emergent and inclusive, uses natural language and is ethical, and the researcher is the main research instrument; (e) it is well triangulated and informed; and (f) it is strategically organized toward knowledge production, understanding of specific cases, advocates a particular perspective, works toward transferability, providing findings, or improving a situation.

Rationale for Qualitative Embedded Single Case Study Design

The evolution of the case study methodology as proposed by Yin (1997) takes a more quantitative approach to terminology, while still incorporating qualitative reasoning and approaches. In essence, Yin proposed a blended perspective on evaluative case studies using a mixed-methods approach. The use of multiple sources of evidence, rich context, definition of case, and triangulation of data are explicit in both accounts of case study methodology (Yin). Yin also addressed some overarching themes that should be given ample attention when using the case study approach to data collection. In particular, he posed three overarching themes connecting different philosophies of case study research: (1) triangulation of multiple sources of evidence, (2) studying the phenomenon in the context giving attention to rich depth of detail, and (3) the process of analytic generalization as opposed to statistical methods of generalization. Rigor in case study research is also a theme that crosses researcher boundaries focusing on the collection of reliable data and rigorous analysis.

Using a single case study methodology also requires an in-depth understanding of the context of the particular case, which includes its social, historical, and political dynamics. This potentially complex environment requires the researcher to interpret the collected data in a way that enables him or her to extract deep meaning—i.e., knowledge that goes beyond information that can be tallied, charted, and correlated. Single case studies can be comprised of large quantities of variables that Yin (2012) ascribed to three affective conditions: 1) temporal pattern of multiple conditions over time, 2) in-depth investigation of the case, and 3) the contextual conditions that exist externally to the case but are integrated in the research process. Dealing with apparent multiple variables as they relate to dramatically fewer data points in case studies has far reaching implications for research design. A common use of case studies in educational

psychology is for explanatory purposes, where, for example, the outcomes of a curricular approach would need to be evaluated for effectiveness (Yin). A case study approach would appropriately be used to explain how learning took place in context, using descriptive and explanatory measures in the assessment process. Furthering the usefulness of the case study, applying qualitative methods to the evaluation of an academic program would lend itself to a description of the “context, evolution, and operations of the program” (Yin, p. 144).

Unfortunately, critique and misuse of the case study approach has created a sense of pessimism within the research community. Specifically, the case study strategy is undermined when concepts lack trust and/or credibility, and when the perceived inability to produce generalizable findings negate its usefulness as a methodology to explain everyday problems in context (Yin, 2012). In contrast, Yin stressed the importance of developing strong processes where a systematic approach to the case study allows for (1) the creation of a traceable audit trail and (2) the creation of a viable and trustworthy body of evidence that allows readers to check the process and interpret findings along with the researcher. Careful research design in case studies can allow for a systematic approach to data collection and analysis, while still allowing for the realization of unanticipated findings (Yin, 2012).

The first step to the design process according to Yin (2012) is defining the actual case that will be the subject of inquiry; this case serves as the main unit of analysis within the research design while allowing for nested units of analysis. A case study designed to evaluate the curricular aspect of an educational program—where the program is evaluated on the learning process that occurs in different populations within the study—represents an example of an embedded unit of analysis. In this study, the main unit of analysis was faculty and community partner liaison teaching and learning in the CAFS (CAFS) Minor in the College of Agriculture

and Life Sciences (CALs) at Virginia Tech (a LGU in southwest Virginia). Its embedded units of analysis were specific dyads engaged in the minor: faculty-faculty, faculty-community partners, and faculty-students.

Research Design

Purposeful sampling was implemented for selection of participants in this study. Case study participants—, who were either interviewed, observed, or both—were selected from the membership of the CAFS Taskforce, which is the organizational steering committee for the CAFS minor. To be eligible for participation, these individuals had to have a collaborative team teaching role in one of the required courses in the CAFS minor: 1) ALS 2204, Introduction to Civic Agriculture and Food Systems; 2) ALS 3404, Ecological Agriculture: Theory and Practice; 3) ALS 4204, Advanced Concepts in Community Food Systems; and 4) ALS 4214, Capstone: Civic Agriculture and Food Systems.

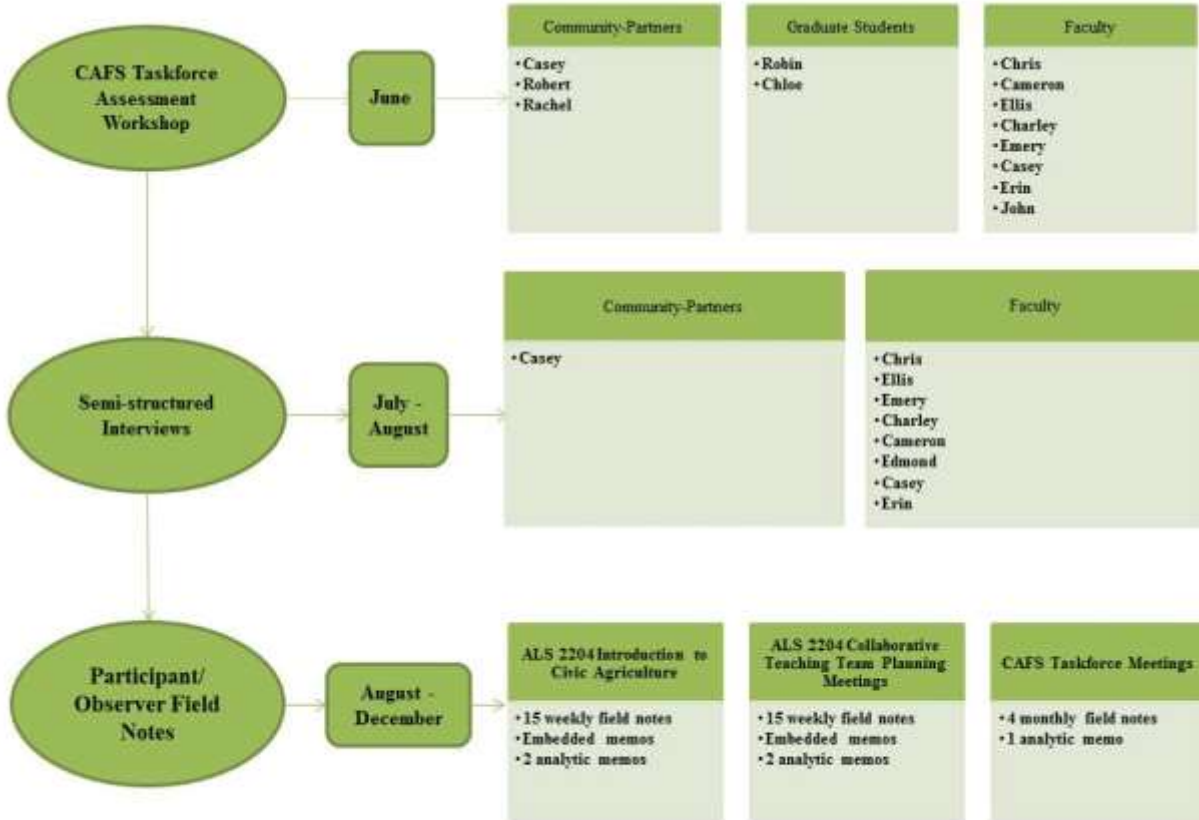
Participants

This study utilized semi-structured interviews involving seven faculty members and one community partner (eight in all)—all of who taught in a core course and were members of the CAFS curriculum taskforce. The faculty represented the following departments within the College of Agriculture and Life Sciences: Agricultural and Extension Education, Entomology, Horticulture, Human Nutrition Foods and Exercise, Animal and Poultry Science, and Office of Academic Programs in the College of Agriculture and Life Sciences. The community partner represented a local non-profit in partnership with the CAFS minor and the College of Agriculture and Life Sciences.

As the researcher I conducted field observations during the Fall 2013 semester—principally during (1) CAFS introductory core course sessions involving the collaborative teaching team, (2) weekly planning meetings, and (3) CAFS Curriculum Taskforce monthly planning meetings. The observed collaborative teaching team was comprised of one faculty representing Agricultural and Extension Education, one faculty representing Horticulture, one community partner liaison, and one graduate teaching assistant (GTA)—namely the researcher for this study who acted as participant-observer. The CAFS Curriculum Taskforce meetings included faculty collaboratively teaching in one of the four core courses, community partners, institutional partners, college administration, and graduate students, as follows: one faculty from Horticulture, two faculty from Agricultural and Extension Education, one faculty from Animal and Poultry Science, one faculty from Entomology, two faculty from Crop Soils and Environmental Science, one faculty from Plant Pathology Physiology and Weed Science, one faculty from Human Nutrition Foods and Exercise Science, one faculty from College of Agriculture and Life Sciences Office of Academic Programs, one Graduate Student (Agricultural and Extension Education), one non-profit community partner, one institutional partner, and an administrator from the College of Agriculture and Life Sciences. It should be noted that not every member attended each monthly meeting.

Figure 2.

Data Collection Protocol Map



Data and Data Collection Procedures

In order to answer the research questions, a single embedded case study design was implemented to explore sustainable agriculture education at a land grant university. This strategy facilitated a greater understanding of context (i.e., the social, historical, and political dynamic associated with the case study), as well as enabled the researcher to interpret the data more purposefully. As noted above, the unit of analysis was faculty participating in the CAFS

minor and the learning that occurs through engagement with other faculty, community-partners, and students.

Data collection and analysis in this case study incorporated multiple methods. Table 1 and 2 outline the data collection protocol and timeline for this study. The researcher-as-instrument in the study design implemented the research protocol and use of an inductive process to analyze data, while allowing for emergent themes in a constant comparative method (Creswell, 2009). Use of a program assessment workshop, semi-structured interviews, and observational field notes represented the primary methods of qualitative inquiry for exploring the processes experienced by faculty engaged in teaching and learning in the CAFS minor. The role of the researcher as participant-observer (i.e., where the role of observer is secondary to that of participant) allowed for unique aspects to be observed and recorded as experienced (Creswell, 2009). One limitation should be noted: the presence of the researcher as participant-observer in the ALS 4204 classroom and collaborative teaching team is that the observational skills or attentiveness of students might be lessened (Creswell). Observational data was collected using field note and memoing techniques informed by Rossman and Rallis (2003) and Charmaz (2006). The researcher observed the interactions and experiences of faculty with other faculty and community-partners in the classroom, collaborative teaching, and taskforce strategic planning meetings. This observational data, collected over the course of an entire semester, is expected to enhance understanding of the how faculty understand and participate in everyday work experience and illustrate sustainable agriculture education at a land grant university. One-on-one interviews allowed the researcher to gain insights where the participant cannot be observed directly, and allow for historical information to be collected (Creswell).

Constant comparative methodology (Charmaz, 2006) was implemented with the assistance of Atlas ti, qualitative analysis software. Open coding of field notes, memos and interview transcripts was conducted simultaneously with data collection. Embedded memos were included in the open coding process to inform future analytic memos. Preliminary analytic notes in the form of memos serve as a level of analysis. Focused coding, brought codes to the level of categories. These categories are included in an intensity matrix. Code matrix tables are utilized to show the frequency of code occurrence within each primary document. Primary documents are: interview transcripts, field notes, and secondary data sources. Coding, using the constant comparative method, involved attaching labels to observations, interactions and collected materials that were sorted and synthesized forming tentative categories. Analytic memos synthesized data creating a logic trail that can be traced to the individual primary documents and field notes that informed the process through a labeling structure.

Table 1.

Data Collection Protocol

Data Collection Approach
Assessment Workshop
<ul style="list-style-type: none">• CAFS Taskforce Assessment Workshop: Secondary Data (Course Syllabi, Discussion Transcripts, Collaborative Teaching Team Created Documents)• Observer field notes from CAFS Taskforce Assessment Workshop
Observations
<ul style="list-style-type: none">• Introduce study to ALS 2204 faculty, community-partners, and students during first class meeting through power point slides.• Gather weekly field notes as participant-observer in ALS 2204 using pad and pen taking notes during class and composing field notes immediately after class sessions.• Compose weekly memos on ALS 2204 field notes• Compose analytic memo on ALS 2204 weekly memos (logic audit trail)• Gather weekly field notes in CTT meetings using lap top• Compose monthly memos on CTT meeting field notes• Compose analytic memo on CTT monthly memos (logic audit trail)• Gather monthly field notes on CAFS Taskforce meetings using lap top• Compose analytic memo on CAFS Taskforce field notes• Constant comparative analysis using Atlas ti
Interviews
<ul style="list-style-type: none">• Conduct semi-structured interviews, audiotape the interview, and transcribe the interview.• Compose memos after coding each individual interview• Compose analytic memo on coding memos (logic audit trail)• Constant comparative analysis using Atlas ti
Audit Trail
<ul style="list-style-type: none">• Compose memo from individual interviews and observations (confirmability audit)

Table 2.

Data Collection Timeline

DATE	Data Collection Activity
June, 2013	<ul style="list-style-type: none"> • Submit IRB • Obtain verbal approval to collect data in CAFS Taskforce meetings from program director • Obtain verbal approval to collect data in ALS 4204 from faculty • Recruitment: Purposeful Sampling/ CAFS Taskforce list serve
June -August, 2013	<ul style="list-style-type: none"> • Conduct CAFS Taskforce Assessment Workshop: Participatory Semi-Structured Design (Curriculum Assessment & Coalition Effectiveness Evaluation Embedded) • Analysis of CAFS Taskforce Assessment Workshop secondary data • Conduct Individual Semi-structured Interviews faculty, graduate student & community-partner (Purposeful Sample, n=14) • Transcribe Interviews and Analysis
August-December, 2013	<ul style="list-style-type: none"> • Weekly Field Notes in ALS 2204 (n=15) • Monthly ALS 2204 Memos (n=5) • Field Notes in weekly CTT Meetings • Analytic Memos • Data Analysis

The proposed study was informed by *a priori* propositions as the basis for the theoretical framework that informed the research questions and methodology. The theoretical framework is based around a discourse in sustainable agriculture education and is summarized in Table 3.

Table 3.

A Priori Propositions

Proposition	Supporting Literature	Research Questions	Data Collection Method
Faculty work as learning is a socio-cultural practice illustrated as collaborative teaching	Collaboration amongst faculty within and across disciplines is defined by Lattuca and Creamer (2005) “as a social inquiry practice that promotes learning,” (p. 5).	1. How do faculty understand and participate in collaborative teaching?	Assessment Workshop Interviews Participant/Observer field notes
Faculty work as learning is a socio-cultural practice illustrated as interdisciplinary teaching	Interdisciplinary teaching is a practice where faculty gain new teaching strategies and insights, are intellectually stimulated, and are more reflective on both their own learning and their students learning (Lattuca, 2001; Thorburn, 1985). It is also indicative of sustainable agriculture teaching and learning (Parr, Trexler, Khanna, & Battisti, 2007).	2. How do faculty understand and participate in interdisciplinary teaching?	Assessment Workshop Interviews Participant/Observer field notes
Service-learning is a pedagogical practice to enhance learning through community-partnerships	The praxis of service-learning embedded in experiential learning courses bridges theory with practice engaging students in real world problem solving; service-learning provides teaching and learning opportunities within the community food system as a form of civic engagement (Butin, 2010; Duncan & Kopperund, 2002; Jacoby, 2007 Niewolny et al., 2012)	3. How do faculty understand and participate in service-learning as a pedagogical practice?	Assessment Workshop Interviews Participant/Observer field notes
Faculty as agents of social practice at a land grant university	The role of the scholar was not to dictate to the public, but to serve and inform with academic freedom to report findings with trustworthiness (Peters, 2010).	4. What are social outcomes relevant to the role of sustainable agriculture education faculty at a land grant university?	Assessment Workshop Interviews Participant/Observer field notes

Data Analysis Procedures

Issues of Generalizability and Credibility

Important to note is that the researcher was a learner of qualitative inquiry at the time this study was envisioned and developed—which is not to excuse any errors of design or interpretation. Rather, this statement reflects the researcher’s level of experience in constructing a viable methodology and overarching purpose for a study of this nature. Additionally, the interpretation and evaluation of data was based on philosophical assumptions developed through interactions within a single discipline, or, further adding to the study’s complexity, interdisciplinary collaborations. The researcher’s personal history, interests, and insights toward a phenomenon being studied—can be made transparent through critical reflection throughout the research process. This process involved clearly stating assumptions and theoretical associations that the researcher brought to the study. Three areas of insight into the researcher’s interpretive process that will also be addressed in the researcher reflexivity are that (1) the researcher is a graduate teaching assistant (GTA) working closely in a collaborative environment in agriculture education, (2) the researcher is a member of the CAFS Taskforce (the organization driving the structure and execution of the CAFS minor), and (3) the researcher has *a priori* knowledge and assumptions that have guided the development of the theoretical framework for the study.

As noted by Camp (2001), “The [researcher] who knows nothing about the subject may be free of bias but [she] will not discover anything” (p. 5). In other words, qualitative researchers bring to the research process underlying assumptions and theoretical groundings that enhance the creation of knowledge through inquiry. Similarly, Schwandt (2000) suggested that “Understanding requires the engagement of one’s biases” (p. 195). Despite the potential for bias in a qualitative study, there are strategies for engaging productively and dispassionately with the

research design and methodology. For example, continuous analytic memoing can enhance the ability to interpret findings in a more logical way, therefore adding credibility of the study. It also provided a mechanism for addressing reflexivity while interpreting the data (Rossman & Rallis, 2003). Whether engaged in quantitative or qualitative inquiry, “Preconceptions and biases inevitably surface in the design and interpretation of results” (Camp, p. 4). The subjective nature of qualitative inquiry implies a different approach for understanding the role of the researcher—namely, as an *instrument* actively engaged in developing a working understanding of data and interpreting it in the form of words (Rossman & Rallis). Implementing a systematic method of inquiry will allow the reader to follow explanations of decisions made throughout the study, while also documenting the process for readers to critique (Rossman & Rallis). For this study, use of analytic memos and field note memoing minimized the risk for researcher bias and unsubstantiated assumptions throughout the data collection and analysis process.

Trustworthiness: Criteria for Establishing Rigor and Credibility in Qualitative Inquiry

Establishing credibility in qualitative inquiry begins with a comparison of the rationalistic view of rigor that is implemented in quantitative research design. Rigor establishes the quality of a study (i.e., its internal validity); in contrast, relevance establishes a study’s external validity (Guba, 1981). The relevance of a study is important to all researchers—no less so than those engaged in qualitative inquiry. However, because the rigor of a qualitative study tends to be thoroughly scrutinized, researchers who use qualitative methodologies argue that rigor in research design and methodology must be maintained by implementing the additional criteria of trustworthiness as an equal to rigor (Guba; Guba & Lincoln, 1986). The study sought to maintain a high level of trustworthiness by adhering to the suggested methods for achieving this essential goal in qualitative research design and methodology (Guba; Guba & Lincoln).

The emergent nature of qualitative research design has implications for the setting in a naturalistic paradigm. Conducting the inquiry in natural settings, allowing for all of the possible interactions and experiences inherent to the context to emerge, will enhance data collection (Guba, 1981). The researcher in this study was a participant-observer of the phenomenon, as she was actively engaged in collaborative teaching within the minor and actively contributes to the collaborative, interdisciplinary, community-based, and service-learning curriculum. Taking into account the orientations that a naturalistic qualitative researcher holds, as well as some of the differences that occur between naturalistic and rationalistic paradigms and qualitative and quantitative inquiry, a definitive meaning and strategy to trustworthiness in qualitative research is important to establish before, during, and after the research process. The criteria of trustworthiness to be addressed by the researcher in this study will be further discussed to allow for clarity and explanation of process to build credibility in the methodology proposed.

Establishing trustworthiness of qualitative research should speak to the following concerns posed by Guba and Lincoln (1985): truth value (scientific term: internal validity, naturalistic term: *credibility*), applicability (scientific term: external validity/generalizability, naturalistic term: *transferability*), consistency (scientific term: reliability, naturalistic term: *dependability*), and neutrality (scientific term: objectivity, naturalistic term: *confirmability*). The truth value of qualitative research can be established through establishing credibility in findings. Naturalist paradigm researchers would embrace the complexity found within the relationships of multiple factors embedded in the context of a study, while rationalists would isolate specific factors and statistically control for them (Guba, 1981).

In the study the researcher included methodological procedures to enhance the inquiry process and establish trustworthiness. These procedures included: 1) prolonged engagement as

participant observer in the classroom setting, CAFS Curriculum Taskforce, course collaborative teaching team member, and continuous community engagement with the CAFS community-partners as the graduate teaching assistant (GTA) to create a comfortable environment for participants and gain intimate understanding of the case; 2) persistent observations and journaling to produce rich descriptions in context to inform readers and establish prevalent unique qualities of the program; 3) triangulation of data sources: semi-structured interviews, observational field notes, and secondary data; 4) establishing an audit trail; and 5) member checks (Guba, 1981).

The researcher, addressing the issues of applicability and transferability of findings from this study was established by thick description of context to establish if similarities exist between two different situations creating fitness (Guba, 1981). In opposition to the guiding assumption of rationalists that truth statements are context free, the naturalistic paradigm views context as being tied closely to the phenomenon being observed. Guba citing Cronbach (1975) “has argued that all generalizations decay like radioactive substances, having half-lives, so that after a time every generalization is ‘more history than science’” (p. 80). In the study the researcher established transferability by using purposeful sampling, collecting thick descriptive data, and developing rich descriptions of the context to allow for the audience to judge fit-of-findings to their situation (Guba). The findings from the proposed study can be transferable to similar situations—namely, where an interdisciplinary team of faculty with the support of students, administration, and a strong community-partner located within a LGU college of agriculture and life sciences, wish to establish a new SAE program at the minor level with access to external and internal funding. Expected findings may be used a list of ingredients necessary (instead of a hard-and-fast recipe), where adaption to a new setting would be beneficial.

Consistency can be addressed through dependability, or the stability of the data. Naturalistic researchers must allow for the instabilities that arise due to the adaptability of qualitative methods, Guba (1981) suggested methods to be integrated into the proposed study with the purpose of creating dependability in the findings. Use of multiple methods of data collection were implemented to ensure stability of interpretations through semi-structured interviews, document analysis, and semi-structured interviews to integrate active participation of faculty in the data collection, analysis, and evaluation of findings. In addition to using multiple methods of data collection, the researcher addressed the issue of credibility through an established audit trail. This audit trail is displayed in the code mapping table 4 found in chapter three and code matrix tables found at the beginning of each category description in chapter four. The final area of consideration when establishing criteria for trustworthiness in qualitative inquiry is that of confirmability, where naturalistic researchers move away from objectivity and look to address neutrality within data (Guba). The two areas where the researcher implemented good practice are triangulation of data from multiple methods and sources and practicing reflexivity through analytic memos and journaling (Guba).

Researcher Reflexivity

As a qualitative researcher adhering to a naturalistic paradigm, implementing qualitative methods relates to the purpose and use of qualitative inquiry as learning (Rossman & Rallis, 2003). Learning viewed through a socio-cultural lens exemplifies the co-construction of meaning through research involving the researcher, participants, and the greater scholarly community. Consequently, the objectives, research questions, methods, interpretations, and communication of findings through my written work are adherently shaped by the values and beliefs I hold. I am a 36 year old female who is a PhD candidate in the process of completing

my graduate studies. As a graduate student, my work is influenced by members of my graduate committee and faculty that I interact with both in and outside of my disciplinary home department. I understand these interactions as having two outcomes. One outcome of interactions with faculty as a graduate student is the growth and professional development as an educator and researcher, however there is a negative impact to this relationship also. The dynamic between faculty and graduate student consists of a power structure, where decisions to this study are made to satisfy a larger group of researchers who bring with them diverse disciplinary understandings of the context.

I completed my BSA and MEd contiguously and then spent 10 years teaching in the K-12 school system and working in the agriculture industry before transition back to academia as a graduate student. Bringing this experience with me I hold a larger capacity for professionalism in my work and have found it easier to navigate academic work in a politically charged environment, more so than students that have not obtained this type of experience outside of academia. In addition to this background I also bring with me the position of being the only college graduate of my immediate family, where a high school education was the pinnacle of my parents and siblings educational experience.

I also find it necessary to explain my role in the community of inquiry, both on a level of sustainable agriculture education in higher education and within the Civic Agriculture and Food Systems minor at Virginia Tech. I have always been actively engaged in agriculture—from horticultural production in the green industry to sustainable agriculture education implemented at the secondary level. Sustainable agriculture and sustainable agriculture education (SAE) represent research interest topics that influenced my return to graduate school. As such, the growing presence of SAE in both secondary and post-secondary curriculum is a driving force in

determining my career trajectory. In other words, the focus of the proposed research is a natural progression of my experiences teaching and learning in the Civic Agriculture and Food Systems minor. I am the graduate teaching assistant for the CAFS minor and a participant in the collaborative teaching teams for the ALS 2204 and ALS 4204 core courses. The ALS 2204 Fall 2013 course was the environment for observations, and I was a member of the collaborative teaching team that I was observing. An overarching purpose for connecting the practice of sustainable agriculture to the emerging movement of sustainable agriculture education is to explore the experiences of the educator (both faculty and community-partner) engaged in a unique pedagogy that is actively shaping the future of agriculture education at land grant universities. Scholarship in SAE should directly inform the pedagogical practices and philosophy of educators in this interdisciplinary field. I also hold the view of learning as a socio-cultural experience, shaped through a process of experience where meaning making is constructed through an embodied approach.

Limitations of the Study

This study contained some inherent limitations that occur when a case study methodology is implemented. The small participant population, sampled purposively, but drawing from a limited quantity of actors, described the experiences of only those individuals and may not be generalized to the larger population engaged in sustainable agriculture education curricula. The researcher as participant-observer, collecting ethnographic data and using constant comparative analysis, created an inevitable risk for bias in the interpretation of the data. One important limitation of the interview process is that not all participants will articulate their perspectives, since the presence of researcher or other participants may alter the data collected due to the unease of participant (Creswell).

CHAPTER 4

FINDINGS

“If learning is a prerequisite to teaching, research, and service, then higher education researchers and practitioners would be wise to understand the factors and contexts that promote and sustain faculty learning” (Lattuca, 2005, p.14).

The purpose of this study was to explore the experience of faculty teaching and learning in experiential-based sustainable agriculture education (SAE) at a land grant university (LGU). Specifically, I sought to understand faculty work as learning-through-engagement with faculty, community-partners, and students. To that end, I evaluated the process of service-learning as a viable pedagogical practice to enhance experiential-based curricula in sustainable agriculture education at an LGU. Lastly, SAE was explored as an emerging and effective solution for tackling complex issues in the current agrofood system. As such, it is proposed herein as a powerful catalyst for revitalizing the LGU mission through innovative praxis.

Questions Guiding this Study and Emergent Themes

The following overarching research question and four sub-questions were investigated:

From the perspective of sociocultural learning, how do faculty learn within a sustainable agriculture education program at a land grant university?

1. How do faculty understand and participate in collaborative teaching?
2. How do faculty understand and participate in interdisciplinary teaching?
3. How do faculty understand and participate in service-learning as a pedagogical practice?
4. What are social outcomes relevant to the role of sustainable agriculture education faculty at a land grant university?

In this chapter findings are reported from semi-structured interviews, participant observer field notes, and secondary data. As a participant in the Civic Agriculture and Food Systems Minor at an LGU, research questions were developed with intimate knowledge of SAE and the case. Analysis of the data resulted in four distinct themes that relate to the four sub-questions that guided the study: (1) Collaborative Teaching in Higher Education, (2) Interdisciplinary Teaching in Practice, (3) Participation in Sustainable Agriculture Education Program, and (4) Service-Learning as Reflective/Critical Practice. The emergent data from this investigation is organized according to these four themes and fifteen corresponding categories. Each theme is explained and further illustrated with supporting data from categories. Table 4 represents the code map depicting three iterations of analysis and table 5 outlines the four themes and corresponding categories.

Table 4.

Code Mapping: Three Iterations of Analysis

Code Mapping: Three Iterations of Analysis (to be read from bottom to top)

Code Mapping For Civic Agriculture and Food Systems Minor
(Research Questions 1, 2, 3 and 4)

RQ1. How do faculty understand and participate in collaborative teaching?	RQ2. How do faculty understand and participate in interdisciplinary teaching?	RQ3. How do faculty understand and participate in service-learning as a pedagogical practice?	RQ4. What sociocultural outcomes might result from faculty learning within this sustainable agriculture education program?
------------------------------------------------------------------------------	----------------------------------------------------------------------------------	--------------------------------------------------------------------------------------------------	-------------------------------------------------------------------------------------------------------------------------------

Third Iteration: Emergent Themes/Application to Data Set

RQ1. Collaborative Teaching in Higher Education	RQ2. Interdisciplinary Teaching in Practice	RQ3. Service-Learning as Reflective/Critical Practice	RQ4. Participation in Sustainable Agriculture Education Program
----------------------------------------------------	------------------------------------------------	----------------------------------------------------------	--------------------------------------------------------------------

Table 4 continued: Code Mapping: Three Iterations of Analysis

Second Iteration: Focused Coding/Constant Comparative Analysis			
RQ1.	RQ2.	RQ3.	RQ4.
Roles and Participation in Collaborative Teaching	Learning Disciplinary Knowledge	Understanding Service-Learning as Pedagogical Practice	Identifying Student Learning
<i>Sub Categories- Role of Instructor of Record Role of Collaborating Faculty Role of Community Partner Liaison</i>	Recognizing Disciplinary Perspective	Understanding the Community Partner as Educator	Learning Situated in Sustainable Agriculture Education
Understanding the Collaborative Teaching Model	Understanding Interdisciplinarity		Teaching in Sustainable Agriculture Education
Feelings toward Collaborative Teaching			
Learning Pedagogical Practices			
Navigating Administrative Structure			
Navigating Collaborative Work			
Outcomes of Collaborative Work			

Table 4 continued: Code Mapping: Three Iterations of Analysis

First Iteration: Open Coding/Surface Content Analysis		
RQ1. Course Design and Structure	RQ1. Role: Instructor of Record	RQ2. Understanding Interdisciplinary Teaching
RQ1. Environment_Class size	RQ1. Model Adaptive	RQ3. Faculty Expectations
RQ1. Barriers	RQ1. Collaborative Scholarship	RQ3. Pedagogical Practice
RQ1. Faculty Personalities	RQ1. Benefits Pedagogical Knowledge	RQ3. Problem Solving
RQ1. Administrative Practice	RQ1. Challenges_Consensus	RQ3. Purpose
RQ1. Assessment	RQ1. Challenges_Content	RQ3. Reciprocity
RQ1. Benefits_Enriching	RQ1. Challenges_Continuity	RQ3. Reflection
RQ1. Benefits_Each Iteration Becomes Easier	RQ1. Challenges_Faculty Reward System	RQ3. Rewarding_Personal Growth
RQ1. Benefits_Excitement	RQ1. Challenges_Justification	RQ3. Rewarding_Professional Growth
RQ1. Benefits_Learning	RQ1. Challenges_Time	RQ3. Social Impacts
RQ1. Benefits_Networking	RQ2. Access to Information	RQ3. Student Development/Success
RQ1. Understanding the Model	RQ2. Complex	RQ3. Understanding SL
RQ1. Professional Impacts: Funding	RQ2. Confidence in Interdisciplinary Practice_Doing what you Say you are Doing	RQ4. Participation
RQ1. Professional Impacts: Networking	RQ2. Defining Interdisciplinarity	RQ4. Transformation
RQ1. Professional Impacts: Pedagogical Practice	RQ2. Discipline	RQ4. Collaboration
RQ1. Role: Community Partner	RQ2. Knowledge Expertise	RQ4. Interdisciplinarity
RQ1. Role: Faculty	RQ2. Disciplinary Language Barrier	RQ4. Social Practice Promotes Learning
RQ1. Role: Graduate Teaching Assistant	RQ2. Learning from Others	RQ4. Understanding an Alternative Approach
		RQ4. Learning in SAE
DATA	DATA	DATA

Table 5.

Emerging Research Themes and Related Categories

Themes	Related Categories
1. Collaborative Teaching in Higher Education	<ul style="list-style-type: none"> a. Roles and Participation in Collaborative Teaching <ul style="list-style-type: none"> i. Role of Instructor of Record ii. Role of Collaborating Faculty iii. Role of Community Partner Liaison b. Understanding the Collaborative Teaching Model c. Feelings Toward Collaborative Teaching d. Learning Pedagogical Practices e. Navigating Administrative Structure f. Navigating Collaborative Work g. Outcomes of Collaborative Work
2. Interdisciplinary Teaching in Practice	<ul style="list-style-type: none"> a. Learning Disciplinary Knowledge b. Recognizing Disciplinary Perspective c. Understanding Interdisciplinarity
3. Service-Learning as Reflective/Critical Practice	<ul style="list-style-type: none"> a. Understanding Service-Learning as Pedagogical Practice b. Understanding the Community Partner as Educator
4. Participation in Sustainable Agriculture Education Programs	<ul style="list-style-type: none"> a. Identifying Student Learning b. Learning Situated in Sustainable Agriculture Education c. Teaching in Sustainable Agriculture Education

Theme 1: Collaborative Teaching in Higher Education

When the CAFS minor was first envisioned by a group of interdisciplinary faculty in the College of Agriculture and Life Sciences, it was based on a collaborative teaching model that incorporated the academic strengths of each contributor. After four iterations of the minor's core courses, there are now distinct models for collaborative teaching being used currently.

Undergraduates intending to minor in CAFS are required to take four courses: 1) ALS 2204, Introduction to Civic Agriculture; 2) ALS 3404, Ecological Agriculture; 3) ALS 4204, Concepts in Community Food Systems; and 4) ALS 4214, Capstone in Civic Agriculture and Food Systems. The collaborative teaching model for the CAFS minor is best exemplified by the ALS 2204 and 4204 teaching teams.

In the Fall 2013 semester, the collaborative teaching team for ALS 2204 was comprised of the following four contributors: the instructor of record, a collaborating faculty, a community-partner liaison, and a graduate teaching/research assistant. In contrast, ALS 3404 was implemented using a distinctly different model based on a modular approach to collaborative teaching. Currently, ALS 3404 relies on the input of six faculty members from five departments: Agricultural and Extension Education; Crop and Soil Sciences; Entomology; Animal and Poultry Science; Plant Pathology, Physiology, and Weed Science; and one faculty representing the Office of Academic Programs in the College of Agriculture and Life Sciences. Note that this course does not engage the expertise of a community partner or a graduate student in the same capacity that ALS 2204 and 4204 have. The culminating core course in the CAFS minor is the capstone course wherein students design and implement community-action projects as a final requirement for completing the minor. This capstone project serves as an integrated assignment.

Collaborative teaching in the CAFS minor is designed to maximize four important concepts: communication, continuity, clarity, and capacity. These concepts are explained and supported in the category, Roles and Participation in Collaborative Teaching. Specifically, the challenges to collaborative teaching as experienced by members of the CAFS curriculum taskforce (the organizational body driving the development and implementation of the CAFS minor) are the following: clarity of roles and responsibilities of teaching team members, time management, role equity, communication of the collaborative teaching model to students, and understanding service-learning as a pedagogical practice. Additional challenge areas also appear in categories (e) and (f): Navigating Collaborative Work and Navigating Administrative Structure, respectively. These challenges stem from efforts to translate a traditional, single-instructor, single department structure in higher education into a different model for teaching and learning. In fact, the allocation of resources and equity among faculty and their respective departments that support collaborative teaching have been observed to create tension during CAFS Curriculum Taskforce meetings.

Roles and Participation in Collaborative Teaching

Table 6 lists the primary documents that were entered in Atlas ti for qualitative data analysis. Primary documents 1-8 are the 8 corresponding semi-structured interviews, 9-20 are field notes from observation of the Fall 2013 collaborative teaching team in the introductory course, 21-34 are the field notes from observations of the Fall 2013 collaborative teaching team planning meetings, 35-38 are the CAFS Curriculum Taskforce planning meeting field notes, and 39-45 are secondary data comprised of assessment documents from the CAFS Curriculum Taskforce workshop and course syllabi. The documents are listed in a code matrix table where the number of occurrences of the code is noted per primary document in the format of: P# (#).

For example primary Document 1 is a participant interview transcript where the frequency of the code is noted as P1 (3). Participants were given pseudonyms as follows: P1 (Emery); P2 (Charley); P3 (Casey); P4 (Chris); P5 (Ellis); P6 (Cameron); P7 (Erin); P8 (Edmond). The code matrix represents groundedness of codes in the data.

Table 6.

Code Matrix: Roles and Participation in Collaborative Teaching

Data Type	Interview (Primary Document # P1- P8)	CAFS Course Field Note (Primary Document # P9- P20)	CAFS Collaborative Teaching Team Meeting Field Note (Primary Document # P21-P34)	CAFS Curriculum Taskforce Field Note (Primary Document # P35-P38)	CAFS Secondary Data (Primary Document # P39-P45)	
Theme:	* Number of Occurrences in Primary Document Shown in Parenthesis					
Collaborative Teaching in Higher Education	<i>ex: P1(3)</i>					
Category: Roles and Participation in Collaborative Teaching	P1(3) P2(2) P4(6) P5(1) P6(6) P7(4) P8(4)	P9(2) P11(2) P12(6) P13(4) P14(6) P15(3) P16(2) P17(5) P18(2) P19(2)	P21(4) P22(1) P23(2) P24(1) P25(4) P26(2) P27(2) P28(3) P29(2) P30(2)	P31(5) P32(1) P34(2)	P35(1) P37(2)	P39(1)

Chris shared her views on participating in the collaborative teaching team, “I want everyone to participate but we have to know how and why people participate. They should be

able to have a voice.” Erin described her participation by focusing on the general view of the teaching team of which she was a member: “The planning was very collaborative and now that the semester is going on...people are kind of jumping in when it’s their turn.” She further explained the impetus of the teaching team as “trying to pull everybody’s expertise together to shed light on a particular issue.” Edmond described the culture of his teaching team: “It’s very open and inclusive for all of the faculty to participate.”

The level of participation tended to be moderated by specific characteristics described by faculty as impactful to the experience of collaborative teaching. These characteristics included communication, the decision-making process, common purpose, common pedagogy, and autonomy. Faculty participants viewed communication as essential for a collaboratively taught course to be successful. Members of the CAFS Curriculum Taskforce—which, as noted earlier, is a decision-making body of faculty, community-partners, institutional stakeholders, and graduate students that was established during the initial planning phase—also discussed the place of trust and decision making. Chris explained how these concepts were related: “Decisions need to be made...just the simple nature of time...” She added, “I’m comfortable making those decisions. I hope the team would trust me to make [those] decisions.” As Chris explained, “Sometimes it takes a little bit extra leadership to [get the work done] so I think maybe the autonomy is that it is expected after a couple semesters when you teach so often [that the decision making process is transparent] and you just make the decisions.” Chris clearly stated, “I think we should help our students [to think critically] by really challenging them.” Cameron described the director of the CAFS minor as the “linchpin for developing meaningful community-partner relationships”. She further emphasized that the collaborative teaching team must keep students engaged via the process of service-learning experiences. She emphasized

that “the curriculum should be intentional with set objectives, feature a road map with a basic timeline, and include specific directions on how to reach those goals.”

The faculty participating in one of the core course teaching teams provided insights as to what makes a collaborative teaching team successful. Those components are represented by the four C’s: communication, continuity, clarity, and capacity. Emery, spoke of communication. “What made it work was that everybody communicated fairly well...but we were not in the same classroom at the same time at all times.” Cameron noted the importance of the instructor of record in maintaining continuity: “There’s this connectivity and that would be the person that’s the instructor of record maintaining that.” Observational data illustrates the developing working relationship between the instructor of record and collaborating faculty in the ALS 2204 course:

As the conversation becomes more complex the collaborating faculty and instructor of record easily go back and forth to drive the conversation: this starts to mimic an ideal collaborative teaching environment. The collaborating faculty recognizes the amount of time that is being taken and states that she is running out of time and the instructor of record states that she will stop talking. This exchange is in good humor (P19).

Additionally, another illustration of observed collaborative work in process:

Areas of individual expertise are called upon when needed. Collaboration between the instructor of record and collaborating faculty is seen through dialogue during the lecture/discussion segment of the class, however it is clear that the instructor of record is the lead (P14).

Clarity in the roles of teaching team members was mentioned by Chris: “We’re pretty clear about roles and responsibilities for the most part.” She went on to elaborate how the size of a CTT can

impact clarity and therefore performance: “[The collaborative teaching team has] definitely changed... [it’s become] a smaller team since the beginning which I am personally happy with...it’s better for a lot of reasons, it’s tidier...the moving parts can be confusing.” The notion of capacity as a limiting factor to efficiency and successful collaboration was further addressed by Ellis: “How many faculty can you have involved in three classes? And what is their role?”

While there is significant collaborative learning potential for everyone connected with a collaborative teaching team (faculty and students alike), the model is not without its challenges. Faculty voiced concerns in the following areas: understanding clear roles and responsibilities of teaching team members, managing time commitments (which tend to be highly variable during a semester), communicating the model to students, maintaining equity, and understanding the pedagogical practice of service-learning across the minor. Ellis described the potential hazards of not clearly understanding the role of each collaborative teaching team member. He indicated that “not fully understanding...the delineation of roles and responsibilities” affects participation and understanding of the collaborative teaching model. Ellis also added that time management is a challenge to collaborative teaching in the minor where it “seems like you’re juggling a lot of balls...and if there’s a better way of doing it I have yet to figure it out.” Cameron explained the challenge and difficulty in communicating the model to students, as follows:

I think one of the challenges is how do you best communicate this collaborative teaching concept to the students you’re teaching...and we really need to continually remind the students that this is a collaborative team it’s not just one individual... [it’s] a different paradigm to what they are often exposed to on this campus...I think we need to be more intentional...this is a different way of learning about sustainable agriculture and food systems concepts.

Equity is described by Erin:

I think some of the burden seems like it is falling on the lead faculty just because everybody's busy and it's not clearly one person's job to do it...it needs to fall on somebody to get stuff out to the students. And I think that's the challenge in really trying to figure out how to equitably do all of that, given everybody's schedule and teaching obligations and you know because it [collaboratively taught course] is a relatively small chunk of your overall job.

That last statement—"a relatively small chunk" of one's job—brings up another challenge that Edmond pointed out: the potential disconnect between faculty members and the pedagogical goals of stakeholders in the CAFS minor. As he explained, "It just wasn't my role for the class so I didn't have as much interaction around students in the CAFS minor and those community partners." Cameron described the role development of the collaborative teaching team in the CAFS minor as a work in progress:

That's [the role of each collaborative teaching team member] a process and in that there is service to the community partner, there is service back to the student from the mentorship of that community partner, that reciprocity piece has to exist within a service-learning experience. It should never be a student just left to their own devices so there has to be intention with set objectives and a road map, a timeline of how they're going to get there. I think that can be multiple roles.

In addition, the collaborative teaching team in ALS 2204 constructs an understanding of teaching breadth and depth. An overarching understanding of how much content to incorporate and separating out the responsibility of the individual student:

The teaching team came to the conclusion through discussion that students should look up terminology that they do not know. It is the responsibility of the student to investigate unknown terminology or concepts that the teaching team cannot control that is missing from their educational background. The group all agreed that it is the teaching team's role to walk them through the content and to revisit terminology and concepts throughout the course to solidify student understanding of the complex course topic of civic agriculture (P28).

The ALS 2204 collaborative teaching team also demonstrated growth within the construct of collaborative work:

The collaborative teaching team is learning from past experiences and student achievement. The assignments are becoming more intentional with purpose behind the written assignments that surpasses synthesizing the course content/themes and enters into an authentic process. The scaffolding process is a historical topic of discussion where the teaching team saw room for improvements. The roles of the teaching team are becoming very clear, with a place for everyone to complement each other (P29).

These findings are further detailed in the following subcategories:

Role of Instructor of Record

The responsibilities of the instructor of record in effectively facilitating a collaboratively taught course are best discussed in terms of ALS 2204: Introduction to Civic Agriculture. Specifically, the instructor of record for this course guided course content, facilitated lectures and discussions, drafted an initial lesson plan framework for planning meetings, and served as

principal contact for student administration and organization of course logistics. Observational data illustrated the role of instructor of record:

The instructor of record brought to the meeting a draft lesson plan for week 1 and 2 based off of what was produced the past year the course was taught. The group welcomed this method of updating a lesson plan that had been constructed collaboratively. The syllabus was also brought to the group as draft # 7; also being the final draft, only one small typo was identified by the group and everyone consented that it was in a sharable form for the students (P21).

This role is also illustrated as a facilitator of the collaborative process:

The goal of the meeting is to revise the last two class lesson plans so that the collaborative teaching team will not meet during the Thanksgiving break and to organize for the panels in both class meetings. The instructor of record introduces the lesson plans as drafts modified from last year and open for revision and changes. She has suggested an initial opening question to ask the students to foster discussion and gauge where they are at with the material for that week. The collaborative teaching team members support the question and the collaborating faculty suggests building upon the activity using an easel and paper to record the responses to refer back to later in the class. The instructor of record agrees and then asks the graduate teaching assistant to facilitate the activity (P25).

Course logistics include scheduling guest speakers, planning field trips (identifying locations and coordinating the trips), and undertaking most administrative actions. Supporting the instructor of record was the collaborating faculty and teaching team members, who met with her on a weekly basis in planning meetings, to hear a recap of class experiences, provide feedback as needed, and

help guide further progress. Observational data collected illustrates the roles of the collaborative teaching team members; these roles were updated on a weekly basis as members displayed additional practices that they incorporated into the collaborative teaching team structure:

The roles of the collaborative teaching team are starting to become repetition in the classroom. The instructor of record is responsible for content, collaborating faculty responsible for activities and connections, community partner liaison responsible for fieldwork, and graduate teaching assistant responsible for grading and administrative issues (P14).

Instructor of Record: Syllabus, Lesson Plans, Assignments guidelines, Course content, Student issues & management, Delivery of Content (Lecture based)

Graduate Teaching Assistant: Updating materials/Administrative, Guiding written assignments through feedback process, maintaining oversight/syllabus/assignments

Collaborating Faculty: Activities, overall theme connections to the CAFS minor

Community Partner Liaison: Student engagement with community-partners, bringing the fieldwork into the classroom, weekly writing prompts connecting reflection on service-learning

Collaborative Teaching Team: Guide students through content and revisit to build student knowledge and understanding (P26)

It should be noted that although the course was planned collaboratively, the facilitation of the course and the orientation of the actual classroom allowed limited opportunities for the in-class contributions of the collaborative teaching team. Specifically, the auditorium-type

classroom encouraged the lecture format of delivery, which differed from previous iterations of the course.

During interviews it became clear that collaborative teaching team members teaching in the CAFS minor highly valued the role and responsibilities of the instructor of record. Erin pointed out that “I think at some point you do need to have one person that is in charge and taking more of that responsibility and that should be getting credit for that.” Edmond described the instructor of record as the “lead instructor of the course but he [/she] involves all the other instructors every step of the way with the syllabus, what’s going to be taught on certain days, how we actually go about teaching a lot of the lectures.”

Role of Collaborating Faculty

The faculty members who collaborated in the Introduction to Civic Agriculture ALS 2204 course were all from a different discipline than the instructor of record, which enhanced the interdisciplinarity of the course. Based on first-hand observations, the collaborating faculty contributed in the following ways: integrating the arts into the curriculum, connecting this introductory core course to the final capstone core course, providing new avenues for dialogue during class discussions, and contributing to course planning during teaching team meetings. These responsibilities varied depending on the strengths of the individual faculty member, who also functioned in multiple support ways in other courses taught in the CAFS minor. Observations of the participation of the instructor of record and collaborating faculty lend to the following insight that is specific to the working dynamic of the ALS 2204 collaborative teaching team:

The role of the two faculty members is heavy on one side, and the usefulness of two faculty members in the teaching team might be less after multiple iterations.

The course curriculum was designed collaboratively, but as the course has been offered multiple times the instructor of record is now in a role of leading the course with the collaborating faculty as an additional component. There has been one class thus far in the semester where the collaborating faculty has had a leadership role in the content and even then the role is minimized to the powerpoint lecture segment. The instructor of record maintains control over the lesson plan and activities (P34).

Edmond discussed the fluidity of collaborative teaching team member input: “Some might be left up to the individual instructor if it’s their topic on a given day they will lecture on that, but most of them we all have input on whether we do or don’t go with that lecture and how that fits into the whole framework.” Ellis reflected on the potential danger of underutilizing collaborating faculty: “Unless you are a teacher of one class [instructor of record], everybody else is just sort of superfluous and as a result it’s gonna be tangential or temporary and maybe...everybody’s brush with it will take away something but I don’t know if we will ever see that.” Thus, faculty members did not universally agree that their input was essential to the success of the course.

Role of Community Partner Liaison

As observed in the Introduction to Civic Agriculture ALS 2204 course, the community partner liaison enhanced the curriculum by embedding actual field experiences into class assignments, discussions, and activities. Observational data illustrated the integration of service-learning through community partner liaison involvement.

The collaborative teaching team meeting discussion on fieldwork and updates leads to a conversation where a role of the teaching team is illustrated. The

facilitation of student participation and engagement in fieldwork and service-learning is a key role of the collaborative teaching team. This facilitation is not in the manner of micro managing; rather in the design of transparency in fieldwork assessment and expectations and revisiting and connecting course concepts with the community partner and fieldwork (P23).

Moreover, the community partner liaison represented the wider community of civic agriculture practitioners and therefore brought important educational insights into the classroom. Specific responsibilities of the community partner liaison as observed during the Fall 2013 semester included course planning, course community partner communication, and management of the student service-learning component of the CAFS minor. Cameron illustrated the significance of the community partner liaison in the classroom “we continually say that’s something we want to do [integrate practice in the classroom]...maybe with this liaison role now that’s gonna give it some more traction.”

Understanding the Collaborative Teaching Model

Table 7 presents the code matrix for understanding the collaborative teaching model. The code matrix represents groundedness of codes in the data. See Table 6 for detailed instructions for reading the code matrix tables.

Table 7.

Code Matrix: Understanding the Collaborative Teaching Model

Data Type	Interview (Primary Document # P1- P8)	CAFS Course Field Note (Primary Document # P9- P20)	CAFS Collaborative Teaching Team Meeting Field Note (Primary Document # P21-P34)	CAFS Curriculum Taskforce Field Note (Primary Document # P35-P38)	CAFS Secondary Data (Primary Document # P39-P45)
Theme:	* Number of Occurrences in Primary Document Shown in Parenthesis				
Collaborative Teaching in Higher Education	<i>ex: P1(3)</i>				
Category:	P1(14)				
Understanding	P2(6)				
the	P3(5)				
Collaborative	P4(7)				
Teaching Model	P5(7)				
	P6(9)				
	P7(2)				
	P8(3)				

The faculty involved in the collaborative teaching model routinely stressed the adaptability of the model. Specifically, Emery shared how the course she contributes to have “evolved over time” and that the classroom is “very laid back, very informal, but everybody sort of just participated in the discussion.” In fact, most faculty referred to the classroom environment as discussion based; Charley described interactions in the following way: “Everybody has a voice and everyone contributes to the concept of the course and how it’s kind of implemented and delivered.” Others, such as Casey, viewed collaborative teaching as “sitting

down and planning it all together.” Charley furthered this perspective of collaborative planning in her description:

So what you have is a team approach...you constantly get to hear what other people’s perspectives are. So whether or not you agree with them, you are learning through the process yourself because you can’t really take things for granted that you’re all coming from the same angle.

Casey was critical of the way the collaborative teaching team functioned and what was espoused as practice. “I don’t really know, I guess we are collaboratively teaching... I think it is possible to be in a group and you’re all there and you’re all in the classroom and you may not be collaborating...you’ve just delegated tasks.” In contrast, Edmond asserted that the “quality of the product and the class is much better and the faculty interact...and their all in agreement in the end.”

With the different understandings of collaborative teaching, whether the collaboration occurred in the planning phase, during actual classroom instruction, during the evaluation segment, or in all phases, the theme of consensus continually emerged. As Chris indicated, “We were all consenting...what we wanted to do that felt right...” As noted above, not all views of collaborative work were positive; the group dynamics in the CAFS courses developed differently according to the people involved. Ellis shared his experience that was difficult to navigate because of the lack of clarity of responsibilities, where a “more siloed fields of expertise... [recreating] the hierarchy of the institution and this is how we’re going to interact with each other.”

Feelings toward Collaborative Teaching

Table 8 presents the code matrix for understanding feelings toward the collaborative teaching model. The code matrix represents groundedness of codes in the data. See Table 6 for detailed instructions for reading the code matrix tables.

Table 8.

Code Matrix: Feelings Toward Collaborative Teaching

Data Type	Interview	CAFS Course	CAFS	CAFS	CAFS Secondary
	<i>(Primary Document # P1-P8)</i>	Field Note <i>(Primary Document # P9-P20)</i>	Collaborative Teaching Team Meeting Field Note <i>(Primary Document # P21-P34)</i>	Curriculum Taskforce Field Note <i>(Primary Document # P35-P38)</i>	Data <i>(Primary Document # P39-P45)</i>
Theme:	* Number of Occurrences in Primary Document Shown in Parenthesis				
Collaborative Teaching in Higher Education	<i>ex: P1(3)</i>				
Category:	P1(4)	P13(1)	P27(1)		
Feelings toward Collaborative Teaching	P2(3)		P31(1)		
	P3(3)				
	P4(12)				
	P6(3)				
	P7(2)				

The faculty members and community partner liaison who taught in one of the core courses in the Civic Agriculture and Food Systems (CAFS) minor during the study period displayed varying levels of commitment, duration of experience, and expectations of outcomes. Hence, the researcher was privy to a range of feelings about the collaborative teaching experience. On one end of the spectrum, faculty experienced frustration with management

aspects and were dissatisfied with the commitment and level of investment among some colleagues. Charley voiced frustration on the subject of time commitment: “I don’t really know if anybody else really understood what was gonna be involved in terms of the time and effort commitment.” This frustration and dissatisfaction seem to be balanced by other perspectives described by feelings of invigoration, collegiality, camaraderie, trust, and consensus. Emery noted the importance of relationship building: “You’re pulling people from different disciplines together to do something good.” She also specified “camaraderie among the faculty” as an outcome of the experience. Although the model for the collaborative teaching team varied for each core course taught in the minor, similar feelings were elucidated by other teaching team members. In other words, feelings of frustration coincided with tones of humor.

Learning Pedagogical Practices

Table 9 presents the code matrix for learning pedagogical practices. The code matrix represents groundedness of codes in the data. See Table 6 for detailed instructions for reading the code matrix tables.

Table 9.

Code Matrix: Learning Pedagogical Practices

Data Type	Interview	CAFS Course	CAFS	CAFS	CAFS Secondary
	(Primary	Field Note	Collaborative	Curriculum	Data
	Document # P1-	(Primary	Teaching Team	Taskforce	(Primary
	P8)	Document # P9-	Meeting Field	Field Note	Document #
		P20)	Note (Primary	(Primary	P39-P45)
			Document #	Document #	
			P21-P34)	P35-P38)	

Table 9 continued: Code Matrix: Learning Pedagogical Practices

Theme:	* Number of Occurrences in Primary Document Shown in Parenthesis	
Collaborative Teaching in Higher Edu.	<i>ex: P1(3)</i>	
Category:	P1(5) P7(1)	P24(1)
Learning	P2(1) P8(5)	
Pedagogical Practices	P3(1)	
	P5(1)	
	P6(6)	

As noted earlier, teaching teams in the Civic Agriculture and Food Systems minor include faculty at different stages of their careers from different disciplinary backgrounds in the College of Agriculture and Life Sciences. This, of course, means that they all bring a variety of epistemological and cultural perspectives to the classroom, not to mention unique personal and professional experiences—all of which influence their pedagogical practices. Along these lines, interviewees spoke about the rewarding aspect of learning new approaches to pedagogy and the opportunity to experience first-hand the knowledge and skills of other departmental colleagues. Observations of the ALS 2204 collaborative teaching team further illustrated the integration of alternative pedagogical practice:

The recognition of assignments having a greater purpose of facilitating a scaffold learning process across courses in the minor building toward the final CAPstone project create real world learning experiences that can be translated to professional practice. The role of the collaborative teaching team here is to facilitate and scaffold the process for student learning outcomes (P24).

Charley described her experience in a collaborative teaching team as “kind of like a training experience. You get trained in a different pedagogy and different learning environment.” Ellis

explained the benefit to working collaboratively with others who already had a significant level of teaching experience in higher education:

I'm interested in how everybody does stuff. I've learned little tricks or little ways of thinking of things I never would have thought of. That comes from the benefit of experience or someone trying to be creative about something. That has been really helpful, in terms of education and teaching.

In addition to pedagogical practices, interviewees also noted that intellectual capacity was impacted as well by the collaborative teaching experience. As noted by Cameron, "It [collaborative teaching] expands my intellectual capacity it expands my pedagogical strategies approach as well." She added, "I'm always looking for new ideas that we can use within the classroom that maximize student learning and students experiential learning as well as the content, and how they are acquiring knowledge." Cameron also spoke about broadening her horizons as a faculty member focusing on access to "different experiences other faculty have had...all things that kind of force me to be better at what I do. That's a real strength; it holds me to a higher bar...as a faculty member."

Relationships and connections with faculty were seen as a benefit to one's pedagogical practice. Erin described her experiences in this way:

I think one of the things that is strong about this teaching team is that there are a lot of people that have a lot of great teaching experience in their own content area. They are doing great things within their own courses [and] they bring that perspective and that expertise...to this course...how they structure their lectures and...engage students. It has been great to see that as well from the teaching perspective. It is always instructive for me to see other people teach; you always

learn something...either something that works for you or definitely doesn't work for you.

Similarly, Edmond described the multi-level benefits of working within a collaborative teaching team:

I would say the most rewarding thing for me is I'm learning from the other professors that are helping to teach the class, not only their expertise in their discipline. I'm being educated along the way just like the students are; but in how they go about teaching. So I am seeing...we all have our unique styles and obviously you see some things that work. So that's valuable to you as an instructor.

He concluded: "I think I've learned how to teach better seeing my colleagues do it."

Navigating Administrative Structure

Table 10 presents the code matrix for navigating administrative structure. The code matrix represents groundedness of codes in the data. See Table 6 for detailed instructions for reading the code matrix tables.

Table 10.

Code Matrix: Navigating Administrative Structure

Data Type	Interview	CAFS Course	CAFS	CAFS	CAFS Secondary
	<i>(Primary</i>	Field Note	Collaborative	Curriculum	Data
	<i>Document # P1-</i>	<i>(Primary</i>	Teaching Team	Taskforce	<i>(Primary</i>
	<i>P8)</i>	<i>Document # P9-</i>	Meeting Field	Field Note	<i>Document #</i>
		<i>P20)</i>	Note <i>(Primary</i>	<i>(Primary</i>	<i>P39-P45)</i>
			<i>Document #</i>	<i>Document #</i>	
			<i>P21-P34)</i>	<i>P35-P38)</i>	

Table 10 continued: Code Matrix: Navigating Administrative Structure

Theme:	* Number of Occurrences in Primary Document Shown in Parenthesis		
Collaborative Teaching in Higher Education	<i>ex: P1(3)</i>		
Category:	P1(1)	P21(1)	P35(2)
Navigating Administrative Structure	P2(6)		P36(3)
	P4(2)		P37(3)
	P5(1)		P38(1)
	P6(8)		
	P7(3)		
	P8(1)		

Faculty involved in the CAFS minor experienced challenges when navigating administrative structures at the departmental, college, and university levels. In some cases, these administrative challenges represented a significant limitation in their participation in the collaborative work. One of these reasons had to do with what the organizational structure permitted as far as credit sharing of courses, which was linked to the definition of collaborative teaching. There are many models to describe collaborative teaching. They range from (a) two faculty sharing a single course and teaching from each's disciplinary strengths for the duration of the semester, to (b) co-taught courses where two faculty working closely for the entire semester cross list a single course and share 100% of the burden and credit, to (c) the model of collaborative teaching embraced by the CAFS minor where faculty and community partners teach a class in an interdisciplinary manner. Observation of the CAFS Taskforce meetings illustrated the process of navigating administrative structures:

Faculty are addressed with the question: What does the collaborative teaching team look like? This issue, as the courses are further developed collaboratively, is

addressed: is there a need for numbers above two faculty present in the teaching teams. College of Agriculture and Life Sciences administrative leadership lends to the experience her expectations of department heads to support the efforts of faculty teaching in the interdisciplinary minor. She states that she has not experienced push back from departmental leadership and offers her support navigating conversations of faculty expectations (P36).

Faculty participating in the minor referenced the need for “colleague support and understanding” (Charley), as well as department leadership and organizational structure to recognize their work as valuable—especially in terms of yearly evaluations and ultimately by a tenure committee. Cameron was very specific about some of these challenges. She explained some of the frustration working within the “hierarchy of the education infrastructure...and how they assign credit to faculty for their teaching load.” Cameron further explained that there was “no model currently for doing what it is we are doing.” As a partial solution, she stressed the importance of communicating with department heads for support, while at the same time cautioning the band-aid nature of this approach. She added: “Moving forward if we don’t get more support mandating [collaborative interdisciplinary work] at the upper administration level, at our college, and our department heads...it will not succeed.” Cameron mentioned another organizational barrier for collaborative teaching in the form of managing the university timetable and sharing of credit for teaching courses in faculty reports. Erin admitted that she didn’t “actually know how the credit is spread out [and consequently] my department head knows that I’m teaching it but I don’t know how that looks on paper. I just wanted to be a part of this so I wasn’t really too worried about it this year.”

Charley spoke to the stated mission of both the college and the broader university, which calls for faculty “to be doing interdisciplinary work.” She also shared her views about the disconnect between what the university supports and how faculty are pursuing this kind of work by referencing collaborative teaching in her home department: “The way collaborative teaching is implemented is very different, it’s not collaborative teaching it is co-teaching...where one person has half the semester and the other person has the other half.” The challenges faced by faculty in pursuing a collaborative course model are very real, but can be ameliorated by changes in organizational procedures and policies that can empower faculty to pursue work that compliments both strategic growth plans and an enhanced student/faculty experience. Erin spoke to this issue from her perspective as a CAFS Taskforce member:

I think the conversation we had with the associate dean at the last taskforce meeting was really illustrative because...it seems like this minor is making these conversations happen at the administrative level, which maybe is a bigger scale than some of the other collaborative teaching that’s happened on a piece meal basis. It just seems like [the CAFS minor is] facilitating those conversations and hopefully it will come out that there will be some decisions, some structure, some support at the administrative level for trying to make this happen. We are all seeing that it does work and it is rewarding so I think there’s a lot of potential.

In addition to interview-related insights, observing the collaborative teaching team led to the identification of further logistical issues, such as the availability of rooms configured in ways to promote alternative pedagogical practices employed by faculty teaching these courses.

The discussion transitions to the orientation of the room the class will meet in for the semester. Initially a room was assigned that is small and not conducive to

arranging the chairs in a way to encourage dialogue and group sessions. The collaborative teaching team decided on moving the class to another building where a room is available they are familiar with. The new room is equipped with technology and is large; yet the orientation is in an auditorium with immovable chairs. This is noted in the initial planning meeting as a concern (P21).

At the time of this study, the CAFS Taskforce was meeting on a monthly basis; agenda items and topics of discussion focused around the assessment and program evaluation work of the graduate teaching assistant (also the researcher in this study). A recurring topic of discussion was navigating the college and university administrative structure. As a reminder, the CAFS minor is a college level minor, whose funding is allocated by the College of Agriculture and Life Sciences. The faculty who participate in the minor represent seven departments in the college. While this diverse representation enhances the interdisciplinarity of the curriculum, it also adds multiple layers of administrative leadership and consensus management to everyday functions. The specific challenges associated with navigating multiple departmental level administrations include the following: ownership and use of the core courses taught in the minor, departmental teaching credit and misconceptions of allocated funding, and the importance of allocating time for teaching in the minor to the overall teaching load for each faculty. Even though the CAFS Taskforce members seemed to be flexible in defining the collaborative teaching team model, the challenges noted above made some reluctant to take more administrative responsibilities. Thus, a clear structure for the collaborative teaching team and clear roles and responsibilities of all faculty and support members is recommended if this model is to be fully supported at both the college and university levels. This model and roles of members is found under *Developing Roles of the Collaborative Teaching Team*.

Navigating Collaborative Work

Table 11 presents the code matrix for navigating collaborative work. The code matrix represents groundedness of codes in the data. See Table 6 for detailed instructions for reading the code matrix tables.

Table 11.

Code Matrix: Navigating Collaborative Work

Data Type	Interview <i>(Primary Document # P1-P8)</i>	CAFS Course Field Note <i>(Primary Document # P9-P20)</i>	CAFS Collaborative Teaching Team Meeting Field Note <i>(Primary Document # P21-P34)</i>	CAFS Curriculum Taskforce Field Note <i>(Primary Document # P35-P38)</i>	CAFS Secondary Data <i>(Primary Document # P39-P45)</i>
Theme:	* Number of Occurrences in Primary Document Shown in Parenthesis				
Collaborative Teaching in Higher Education	<i>ex: P1(3)</i>				
Category:	P1(5)	P12(1)	P21(2)	P35(2)	
Navigating Collaborative Work	P2(5)	P13(2)	P22(2)	P36(3)	
	P3(3)	P15(1)	P23(1)	P37(2)	
	P4(10)	P16(2)	P24(1)		
	P5(10)	P17(1)	P25(1)		
	P6(11)	P19(4)	P26(2)		
	P7(4)		P27(5)		
	P8(2)		P28(3)		
			P29(3)		
			P30(4)		
			P31(3)		
			P32(3)		
			P33(2)		
			P34(2)		

Not unexpectedly, descriptions surrounding the topic “navigating collaborative work” varied according to each person’s discipline and views about effective pedagogy. What did come through as essential, however, was the adaptability of collaborative teaching team members as they modified curriculum/content and altered their roles/responsibilities with successive course iterations. Emery noted that during her experience, “We still ended up shifting instructor of record after the semester started and that seemed to help get people more involved.” Navigating this delineation of roles in the collaborative teaching teams was viewed as challenging. Charley described her role as “really messy, but then you don’t know when you’re overstepping...in a lot of ways I still feel like I’m not really sure what I’m in charge of exactly.” Ellis stated that “the collaborative team in the minor needs to be more intentional...” He further explains that “it’s [the CAFS minor] inviting but when you get there it is difficult to figure out how you fit in and nothing is clear.” He suggests that a framework or model that helps teaching team members understand clearly what their roles and responsibilities are would be helpful. Cameron described adaptability in the following way: “We’ve used different models...I think we’re really starting to find our stride.”

Collaborative teaching team members also raised the subject of expectations and how some were unprepared for how much time it took to be involved in a collaborative course.

Charley spoke to this issue quite clearly:

I don’t think it was very explicit as to what the time and resource expectations were of me. And so in my mind I thought of co-teaching and when it came down to it, it was much more effort than I had anticipated, than I had scheduled in my mind and my calendar. I don’t really know if anyone else really understood what was gonna be involved in terms of the time and effort commitment.

The expectations of teaching in the courses were also viewed as potentially problematic. According to Chris, "...when you're outside of your comfort zone from a teaching [perspective] and the content of the teaching, either you admit it and figure out how to get past it or get help for it..." Some collaborative teaching team members spoke about the importance of ensuring transparency in the core courses and the minor overall. Ellis described one of his experiences teaching collaboratively in the following way: "You go into it and you're just, you know, if it's your turn to design the course and there is no resistance from anybody else and no constructive input from another view then it's just your view but it's perceived as collaboratively done." Ellis also framed this issue in terms of the students: "Having the students recognize there was a substantial difference in the teaching methods and the way the course was designed [and] struggling with those students to try and change."

Different disciplinary backgrounds and cultural interpretations of higher education also presented some challenges to faculty as they navigated the process of teaching in the CAFS minor. Cameron described the process of developing a successful team in this way: "You sort of have to get in a [working pattern] where the group sort of coalesces as a unit and becomes one when it's working really well." She also expressed concern about losing the participation of faculty and community partners, which in some cases was related to differences in motivation for participation and cultural classroom practices of teaching team members. Similarly, Erin described the challenge of collaborative work as follows: "We have so many people and I think we need all of those people to address the interdisciplinary problem. But trying to coordinate all of those people, it is challenging." Edmond echoed the view that different views toward teaching and learning can create tension:

When you bring too many [people]...there is potential there that people have different directions that they want the course to go, they have different ideas on something as small as grading. I wouldn't say that's small, you know some are a little harder than others. When you have too many instructors you have too many inputs that could conflict with each other.

On the flip side, however, faculty also spoke about the benefits of working in a collaborative team. Chris stated that “[collaborative teaching] has been very rewarding...you learn how to partner with people. You learn how they work and you find ways to work together. I really do get a lot of personal enjoyment working with the team...” She also described “stronger partnerships [and] a better appreciation for my students as well as my colleagues” as a benefit from participating in collaborative work.

Observations of the Fall 2013 collaborative teaching team provided important insights into the process of developing the course syllabus, lesson plans, and assignments. This particular course (ALS 2204: Introduction to Civic Agriculture) was the fourth iteration being taught by the same teaching team members—only the graduate teaching assistant was different. For this course, the instructor of record used the Fall 2012 syllabus and course materials as a starting point for group revisions of the spring course. The collaborative teaching team revised lesson plans on a weekly basis, thereby allowing the curriculum to be adapted to the changing needs of the students. Assignment guidelines and rubrics were also revised to allow for integrating changes and clarity. Observational data from ALS 2204 illustrates collaborative development of course assignments and lesson plans:

The next item on the discussion agenda is to craft the weekly writing prompt.

This is done in a collaborative manner with the collaborating faculty starting the

prompt and all three additional members tweaking it to fit the theme and allow for student exploration of the topic (P23).

The teaching team then goes to update the lesson plan which is quickly adjusted since it is a field trip to the meat lab and the only items to address in class is handing out the guidelines for the project proposal and handing back the literature review papers. The project proposal guidelines are then updated collaboratively by the group. Use of meeting time is spent addressing language and organization of the guidelines, simplifying and keeping a close eye for alignment with language used in the CAPstone course (P22).

The community partner liaison is absent from the collaborative teaching team meeting this week and offered via email to be filled in and put to a task. The meeting starts with discussing the student field work evaluation form that the instructor of record sent out ahead of time so that teaching team input could be embedded in the revised version for 2013. The graduate teaching assistant had made edits prior to the meeting and discusses them with the collaborative teaching team and is tasked by the instructor of record to draft a revised version and send out to the teaching team to make sure it is meeting our goals with the fieldwork and community engagement piece of the course. The instructor of record is hesitant with the changes at first then embraces the revisions (P24).

The lesson content, however, was developed by the instructor of record alone—with the full approval of the collaborating faculty and community partner liaison. This is not to say that the collaborative teaching team did not have any input into the final lesson plan. Collaborative teaching team members together decided on detailed time structures and section assignments,

with the understanding that flexibility was essential. In other words, adaptability in the organizational flow of a collaboratively taught course is somewhat of a given if it is to succeed. For example, on two occasions the timing of the lecture section exceeded the time allotted for it, which negatively impacted the completion of all topics for the class period. However, the collaborative teaching team members involved were able to modify subsequent lectures to accommodate the glitch. Student management represents another aspect of collaborative teaching that requires flexibility and open communication between members. The teaching team members share communications and actions taken with students every week in the teaching team meetings to keep everyone aware of issues of concern. Observational data from illustrates the process of navigating collaborative teaching:

The collaborating faculty and instructor of record engage in a collaborative teaching conversation that is seamless. When they realize the amount of time the discussion is taking and stop. The direction goes back to the single lecturer style. Allowing for the organic development of collaborative teaching moments the instructor of record and collaborating faculty adapt the lecture power point presentation (P19).

It is important to note that collaboration among teaching team members incorporates the input of the graduate teaching assistant assigned to the intro course. In fact, the collaborative teaching team has made decisions based on the assessment and program evaluation work of the graduate student—many of which focus on common assignments and scaffold learning throughout the core courses to prepare students for participation in the capstone course and for their final community action project. Examples of these graduate teaching assistant-led decisions included removing the ePortfolio from the minor, the establishment of an integrated

critical reflection component, and the institution of a standard grading rubric across the courses. These actions could establish consistency in the minor and allow for assessment tools to be embedded within the courses. The decisions were agreed upon after the members had been involved in an extensive assessment workshop and updates continuously in the taskforce monthly meetings. In summary, navigating collaborative work generally seemed to be friendly and uncompetitive. In contrast, tensions arose when collaborative teaching team members were tasked with issues having to do with administrative structures.

Outcomes of Collaborative Work

Table 12 presents the code matrix for outcomes of collaborative work. The code matrix represents groundedness of codes in the data. See Table 6 for detailed instructions for reading the code matrix tables.

Table 12.

Code Matrix: Outcomes of Collaborative Work

Data Type	Interview (Primary Document # P1- P8)	CAFS Course Field Note (Primary Document # P9- P20)	CAFS Collaborative Teaching Team Meeting Field Note (Primary Document # P21-P34)	CAFS Curriculum Taskforce Field Note (Primary Document # P35-P38)	CAFS Secondary Data (Primary Document # P39-P45)
Theme:	* Number of Occurrences in Primary Document Shown in Parenthesis				
Collaborative Teaching in Higher Education	<i>ex: P1(3)</i>				

Table 12 continued: Code Matrix: Outcomes of Collaborative Work

Category:	P1(1)	P11(1)	P23(1)	P39(2)	P40(1)
Outcomes of	P3(5)	P18(1)	P25(1)		P41(1)
Collaborative	P4(2)		P30(1)		
Work	P5(2)		P32(1)		
	P7(4)				
	P8(5)				

The qualitative data obtained during this study point to multiple outcomes of collaborative work in the minor. The most important benefits for faculty include the opportunity to build relationships with faculty outside of their own disciplines, enhanced teaching practices, expanded research agendas, interdisciplinary/collaborative grant opportunities, outreach opportunities, and intellectual challenges to current thought and practice. Emery spoke positively about the opportunity to build a relationship with a faculty member in her college that she had known for a long time, but “moved in separate circles”; she also shared the value of “hearing some of the research other people are doing in other departments.” Ellis reported that he experienced “a renewed focus on experiential learning,” as well as a renewed understanding of interdisciplinarity. He also explained that he has learned “little tricks or little ways of thinking of things I never would have thought of that come from the benefit of experience or someone trying to be creative about something...that has been really formative I guess in terms of education and teaching.” Further expanding on the impacts of collaborative work, Erin described how it has impacted her research agenda: “It sparked some questions and ideas that I might look at in the future.” Edmond also shared his perspective on the value of collaborative teaching.

Anything that would pull professors together from different disciplines I think is very valuable and the potential...for interdisciplinary grants...and had we known that we had these other parts...we could've gotten together to build something. So I think we've already seen it, but I think there is still even a lot more potential in that respect.

Outreach opportunities are expressed by Edmond in regards to student projects that are already occurring and having an opportunity to assist with those efforts. Casey described the positive outcome of working with a community partner organization, as follows:

The big change is that the [community partner organization] has a really successful [space] and that would not [have] happened without...financial funding, students, conversations...it led the [space] to where it is...it led me to understand this is really part of something larger.”

Scholarship represents another potential outcome of collaborative work; however, few of the participants spoke directly to this issue. Chris mentioned the “reward working towards other scholarship” and the “professional desire to work collaboratively on other topics outside of the class.” And indeed, faculty in the CAFS taskforce participated in the Summer 2013 North American Colleges and Teachers of Agriculture conference hosted at their home institution, creating a dynamic session focusing on the CAFS minor. This was not mentioned in the interviews with participants as an outcome of collaborative work. Two faculty and the graduate student also produced a publication that was accepted by the same organization—but again, the faculty did not mention this.

Theme 2: Interdisciplinary Teaching in Practice

The second major theme that was investigated in this research is interdisciplinary teaching in practice, which resulted in findings in three areas: (a) learning disciplinary knowledge, (b) recognizing disciplinary perspectives, and (c) understanding interdisciplinarity. To reiterate, the interdisciplinary teaching practices of inquiry were in a sustainable agriculture education program that also employed collaborative teaching and experiential learning through the practice of service-learning. Not surprisingly, “interdisciplinary” in this context was tied to the collaborative structure in the teaching practice of the CAFS minor. And indeed, the urgency of solving the complex issues surrounding our agrofood system requires the direct expertise of faculty of varying disciplinary strengths. This statement is supported by the fact that no faculty who took part in this study considered themselves adequate to teach one of the core courses individually—even with access to current available literature from other disciplines. Instead, when prompted to describe how they would teach the course if tasked to describe how they would teach the course alone everyone interviewed replied that they would search out faculty with whom to collaborate during both the planning and teaching phases. Interdisciplinary teaching in practice was viewed as a process demanding transparency and ongoing movement forward to build a truly interdisciplinary approach to teaching and learning in sustainable agriculture education. The following categories are illustrated to further support the theme of Interdisciplinary Teaching in Practice.

Learning Disciplinary Knowledge

Table 13 presents the code matrix for learning disciplinary knowledge. The code matrix represents groundedness of codes in the data. See Table 6 for detailed instructions for reading the code matrix tables.

Table 13.

Code Matrix: Learning Disciplinary Knowledge

Data Type	Interview (Primary Document # P1- P8)	CAFS Course Field Note (Primary Document # P9- P20)	CAFS Collaborative Teaching Team Meeting Field Note (Primary Document # P21-P34)	CAFS Curriculum Taskforce Field Note (Primary Document # P35-P38)	CAFS Secondary Data (Primary Document # P39-P45)
Theme:	* Number of Occurrences in Primary Document Shown in Parenthesis				
Interdisciplinary Teaching in Practice	<i>ex: P1(3)</i>				
Category:	P1(5)				
Learning	P2(2)				
Disciplinary	P3(1)				
Knowledge	P4(1)				
	P5(1)				
	P6(1)				
	P7(2)				
	P8(4)				

As evidenced by interviews, the collaborative teaching team members in this study were motivated to teach the concepts well, which influenced their desire to seek out literature beyond their own discipline. It also sparked their interest in learning from other team members. As Emery noted, “I was soaking in a lot of it.” In fact, several interviewees stated that being exposed to new disciplinary knowledge was a rewarding aspect to teaching interdisciplinary curricula. “I think one of the most rewarding things was learning new things” (Emery). Similarly, Edmond stated: “The most rewarding thing for me is I’m learning from the other professors that are helping to teach the class, not only their expertise in their discipline; I’m

being educated along the way just like the students.” Faculty knew well that “It’s [course content] so complex that no one can be an expert on everything”; as such, they considered access to others disciplinary literature to be very important. As Charley explained, “I was introduced to a lot of new authors outside of my area...that definitely was rewarding.” Also interesting to note is that faculty came to the table with discipline-specific jargon—so much so that, as Charley indicated, “We almost had to translate for each other.”

Recognizing Disciplinary Perspectives

Table 14 presents the code matrix for recognizing disciplinary perspectives. The code matrix represents groundedness of codes in the data. See Table 6 for detailed instructions for reading the code matrix tables.

Table 14.

Code Matrix: Recognizing Disciplinary Perspectives

Data Type	Interview (Primary Document # P1- P8)	CAFS Course Field Note (Primary Document # P9- P20)	CAFS Collaborative Teaching Team Meeting Field Note (Primary Document # P21-P34)	CAFS Curriculum Taskforce Field Note (Primary Document # P35-P38)	CAFS Secondary Data (Primary Document # P39-P45)
Theme:	* Number of Occurrences in Primary Document Shown in Parenthesis				
Interdisciplinary Teaching in Practice	<i>ex: P1(3)</i>				
Category:	P1(3) P6(4)				
Recognizing	P2(12) P7 (5)				
Disciplinary	P3(4) P8(6)				
Perspectives	P4(4) P5(6)				

Teaching in an interdisciplinary curriculum creates opportunities for faculty to learn about the disciplinary perspectives of colleagues in other fields. A concept of significance in higher education is that of the specialization, often described as siloes, approach to knowledge. Charley, for example, described her experience in one of the core courses: “We had a lot of different perspectives there that helped frame what should be presented.” She added that she “had been in a discipline [and] I knew really well where our discipline was related to community food systems, but then seeing how other disciplines were viewing it was really eye opening.” Casey stated that it is “absolutely essential that everybody has some sense of the value of this other person’s knowledge.” Casey also explained how she views others disciplinary knowledge in the planning and teaching of core courses:

I feel like sometimes I’m not involved, but...when someone like Charley can start talking about something she knows from her perspective, which is so different than where Chris is coming from...when she says something and it hits up against how Chris says something, I’m realizing this is [interdisciplinary]. I don’t know if the students can see that sometimes. They have got a different set of what values, in what they really want, and what they value to pass on.

In contrast, Ellis shared a somewhat different perspective regarding the disciplinary perspectives: “You have your field and you’re defending your field and you’re arguing your field and your perspective and there’s resistance, then there’s a lot of interaction going on. There’s floundering but you have your position and your perspective.” He further evaluated his own disciplinary perspective:

I wouldn’t consider myself locked into a discipline. That said I still have the perspective of discipline if I see something I always see it. I will frame it in a

way that has to do with my discipline and I will always approach it in a way that I've been trained in my discipline to approach it. I see that in everybody...even in doing interdisciplinary research. I always see that people are locked into certain ways of thinking, some more aware than others.

Chris shared her perspective of the challenge to interdisciplinary work "...it can really be a struggle...when you don't have the same orientations or disciplinary reach..." Erin described her educational and professional background as "interdisciplinary in terms of using principles and techniques from chemistry, physics, and biology to solve questions..." She connected her background to her experience teaching in the minor:

Teaching in the context of agriculture, you have to talk about the nutrients for the plants, you have to talk about the topography and management practices that contribute to erosion, and so teaching that subject in this course really helped me think about how those basic concepts fit within the context of agriculture.

Understanding Interdisciplinarity

Table 15 presents the code matrix for understanding interdisciplinarity. The code matrix represents groundedness of codes in the data. See Table 6 for detailed instructions for reading the code matrix tables.

Table 15.

Code Matrix: Understanding Interdisciplinarity

Data Type	Interview (Primary Document # P1-P8)	CAFS Course Field Note (Primary Document # P9- P20)	CAFS Collaborative Teaching Team Meeting Field Note (Primary Document # P21-P34)	CAFS Curriculum Taskforce Field Note (Primary Document # P35-P38)	CAFS Secondary Data (Primary Document # P39-P45)
Theme:	* Number of Occurrences in Primary Document Shown in Parenthesis				
Interdisciplinary Teaching in Practice	<i>ex: P1(3)</i>				
Category:	P1(9)		P28(2)		
Understanding	P2(3)		P33(1)		
Interdisciplinarity	P3(2)				
	P4(5)				
	P5(2)				
	P6(2)				
	P7(6)				
	P8(2)				

As this study illustrates, faculty engaged in teaching with cross-departmental colleagues for the CAFS minor are at the forefront of interdisciplinary education. As such, they had definite opinions in terms of their understanding of interdisciplinarity—and how essential it is to have the input of a team with differing intellectual strengths. Erin described it this way:

I think being able to have the expertise of all of these different people really makes the direction of the course different than I think it would be if it was just one person trying to do [the entire course]. Because it is such a huge topic [sustainable agriculture], and to have those experts on those different things.

When asked if they could envision the course being taught by a single faculty member, respondents were hesitant, and spoke to needing others expertise, implementing guest lectures and suggesting external readings to guide discussion of an unfamiliar topic of inquiry. Erin described how she would teach the collaborative interdisciplinary course alone:

I don't know if I could. I don't have the expertise that everybody else brings to the table, but I would imagine if I were tasked with doing it I would certainly be still trying to hunt down experts in those different areas and at least getting some resources from them...their perspective on what's a good reading for this. I would probably still be asking these people.

In one case, however, a collaborative teaching team member saw her disciplinary knowledge as not needed in a specific discussion for the weekly content lesson. Emery disconnected her discipline from the discussion "they don't need a [specific discipline] person in the middle of all that they would present in the class." Interdisciplinarity is also connected to essential field experiences where students and collaborative faculty explore applied agriculture and food systems with the help of local experts. Emery and Edmond, for example, both referenced the significance of their [community partner location] experiences.

Not everyone was enamored by the complexity. Chris, for instance, viewed interdisciplinarity as a process: "you're trained to produce in a discipline...everyone has different levels of comfort...I think we draw on certain disciplines to reveal certain issues..."

Some respondents expressed concern about the potential lack of clarity that could occur through an interdisciplinary exploration of a topic if all faculty members are not participating in a rigorous manner. Ellis commented on this as a "lack of clarity and things start to drift. There's a benefit to that, things might emerge out of that but in terms of delivery of content it's never

quite, it never feels substantive.” Understanding interdisciplinary teaching was observed in the Fall 2013 core course:

The teaching team agreed to an overall purpose for the content of the introduction to civic agriculture course. The content being interdisciplinary in nature, focusing on a sociological perspective and political/economic argument for civic agriculture: the students might not have all of the necessary background knowledge, specifically content and terminology being introduced in readings.

(P28)

In summary, collaborative teaching team members were asked to define the term “interdisciplinarity” with respect to their teaching experiences in a sustainable agriculture education minor. These responses are as follows:

“...people from different expertise areas and different disciplines collaborating, working together to either accomplish a common goal or bring a greater breadth of expertise to a problem or course...pulling people from different disciplines together to do something good.” (Emery)

“...representation from different disciplines, topic areas, content, ideology, pedagogy, diversity of thought is the simplest way to explain it.” (Charley)

“interdisciplinary means you’re gonna join people who have very different views of how the world works. Not simply political or scientific...and try to have them work through systems thinking together.” (Casey)

“...when you are acknowledging your discipline or your field...not to fit pieces of knowledge into a puzzle but to create a whole new question...interdisciplinary work is when you take all the different disciplinary perspectives and you

create...something new...It's about answering the questions." (Chris)

"interdisciplinarity is bringing together individuals from unique disciplines or perspectives and backgrounds...coalescing has to happen...it's that blending of disciplines that results in kind of a common agenda or common product that is truly a mixture of everybody's discipline to present a final product." (Cameron)

"...trying to solve or teach about a concept that doesn't fit in a silo and you need to draw it from different areas in order to be able to fully address the problem." (Erin)

"Including different areas of concentration and education into a single topic." (Edmond)

Theme 3: Service-Learning as a Reflective/Critical Practice

The third major theme that was investigated in this study is service-learning as a reflective/critical practice, which resulted in findings in two areas: understanding service-learning as a pedagogical practice, and understanding the community partner as an educator. As reported by collaborative teaching team members, service-learning represents an essential component of the CAFS minor because it enables students to learn in community-based settings. This practice is incorporated in all of the core courses in the minor. It should be noted, however, that its framework varies according to the course and to the pedagogical intent of the faculty member guiding the service-learning opportunity. The culmination of student progress through the CAFS minor is reflected in the CAPstone project, which is a concluding service-learning community action project implemented during the final core course. However, the lack of a common understanding of the concept of service-learning created somewhat of a disconnect in the curriculum. Specifically, faculty noted challenges related to managing the student's capstone experience, as well as how to effectively incorporate the community partner as an educator. The

following categories are illustrated to further support the theme Service-Learning as a Reflective/Critical Practice.

Understanding Service-Learning as a Pedagogical Practice

Table 16 presents the code matrix for understanding service-learning as a pedagogical practice. The code matrix represents groundedness of codes in the data. See Table 6 for detailed instructions for reading the code matrix tables.

Table 16.

Code Matrix: Understanding Service-learning as a Pedagogical Practice.

Data Type	Interview (Primary Document # P1- P8)	CAFS Course Field Note (Primary Document # P9- P20)	CAFS Collaborative Teaching Team Meeting Field Note (Primary Document # P21-P34)	CAFS Curriculum Taskforce Field Note (Primary Document # P35-P38)	CAFS Secondary Data (Primary Document # P39-P45)
Theme:	* Number of Occurrences in Primary Document Shown in Parenthesis				
Service- Learning as Reflective Critical Practice	<i>ex: P1(3)</i>				
Category:	P1(5)	P8(2)	P23(1)	P35(2)	P39(8)
Understanding	P2(6)	P11(1)			
Service- Learning as a Pedagogical Practice	P3(10)				
	P4(6)				
	P5(9)				
	P6(5)				
	P7(5)				
	P8(4)				

Collaborative teaching team members utilize scaffold engagement in the CAFS minor when introducing students to service-learning. Specifically, all of the minor's introductory core courses feature a learning contract where the learning goals of the student are developed in collaboration with a community partner. Students then participate in reflective group discussions and undertake written assignments in the course that are connected to their service-learning experiences. In this study, five of eight collaborative teaching team faculty reported having previous and contiguous service-learning experiences and components in other courses and/or programs.

The benefits of this scaffold process were discussed by several faculty implementing the service-learning component. Emery shared one of her student's experiences in the core course she taught: "We had one [student] who was just taking this one course and not involving any of the other classes so it took her a little while to figure out what to do...the others knew more about it [service-learning and community-partners] already and established some things and brought that back [to the classroom]."

It should be noted that the definition of the term was not universally understood by faculty to mean the same thing. Ellis, for example, shared his confusion about what service-learning meant: "I get confused, what's service-learning and what's experiential learning...there needs to be structure there, an explicit understanding of what this is meant to do." Table 17 presents a list of words used to describe service learning in the context of this study. As noted, the range of words and intent is quite broad.

Table 17.

Words that Faculty Used to Describe Service-Learning

Reciprocity	Engagement	Trust	Partners	Time	Model
Dialogue	Expectations	Observation	Community	Commitment	Scholarship
Reflection	Relationships	Purpose	Planning	Process	Value
Experience	Communicate	Connection	Problem solving	Needs	Equity
Important	Contribute	Reality	Social	Identify	Intentionality
Participation	Citizen	Development	Optimism	Critical	Coordination
Practice	Civic	Consistency	Overwhelming	Transparency	Understanding

Moreover, given the breadth of the CAFS minor, the specific form that the service-learning component takes can vary significantly. As reported by most of the faculty, however, service-learning opportunities have included fieldtrips facilitated by faculty and community-partners that involve a group service element; while at the other end of the spectrum are critical reflective classroom activities to connect experiences with concepts learned in the classroom. Regardless of the form they take, service-learning is articulated as a reciprocal learning process that needs to be beneficial to the student, faculty, community, and institution. Observational data supported the practice of service-learning as an ongoing development process in the CAFS minor:

The facilitation of student participation and engagement in fieldwork and service-learning is a key role of the collaborative teaching team. This facilitation is not in the manner of micro managing; rather in the design of transparency in fieldwork assessment and expectations and revisiting and connecting course concepts with the community partner and fieldwork (P23).

The standard for service-learning is addressed in the taskforce meeting in response to agenda action items. This standard is described as a quantity of necessary hours for

accountability and also quality in the type of work being done in the field and mechanisms to incorporate experiences in the classroom through assignments, activities, and discussions (P35).

Emery explained the addition of the institution to the list of benefactors in service-learning curricula: “We would not be getting the support for pulling off things like this if it wasn’t going to benefit the larger institution.” She expanded her understanding of service-learning from a historical perspective:

...this is the first time I have felt comfortable enough to say I think [service-learning] is worth academic credit. That doesn’t mean that we haven’t done service before this, but it’s been through extracurricular clubs...where there is no academic credit and I would not want to take that away from the environment at all, it is very important. To actually set up a formal course and give academic credit, it’s got to be more than just doing the service. And so it takes a while to say, Okay, I feel comfortable with this now and I think that it works.

Chris acknowledged the land grant mission in her description of service-learning: “I think trying to work in partnership with another entity to address a social need is in the spirit of the land grant mission entirely, which I value.”

Faculty also spoke to the specifics of designing a curriculum that includes a service-learning component. In particular, they cited three critical considerations: (1) the number of hours spent outside the classroom at the community-partner location, and (2) the number of students that can be managed per semester in the field, and (3) making meaningful connections between the service learning and standard academic content. In terms of that third consideration, Charley stated that students “get the meat of what we teach in the class...we’re kind of the

toolbox...open it up...explore by going out to their service-learning site. That's really for some students the most valuable experience at [institution].”

Although service learning is a potentially powerful teaching tool, faculty faced a number of challenges in implementing that component in their classes. These challenges include keeping students engaged in the process, identifying and incorporating “good” community partners in the experience, and enlisting the participation of collaborating faculty. Chris, for example, had this to say about facilitating service-learning: “[You take] baby steps...no need to make yourself crazy...” Humor is connected also with the challenges of collaborative teaching. Nonetheless, faculty accepted the challenges of including a service-learning component since it afforded important learning and, in some cases, professional benefits.

Understanding the Community Partner as Educator

Table 18 presents the code matrix for understanding the community partner as an educator. The code matrix represents groundedness of codes in the data. See Table 6 for detailed instructions for reading the code matrix tables.

Table 18.

Code Matrix: Understanding the Community Partner as Educator

Data Type	Interview (Primary Document # P1- P8)	CAFS Course Field Note (Primary Document # P9- P20)	CAFS Collaborative Teaching Team Meeting Field Note (Primary Document # P21-P34)	CAFS Curriculum Taskforce Field Note (Primary Document # P35-P38)	CAFS Secondary Data (Primary Document # P39-P45)
Theme:	* Number of Occurrences in Primary Document Shown in Parenthesis				
Service- Learning as Reflective Critical Practice	<i>ex: P1(3)</i>				
Category:	P1(2)	P8(1)	P10(1)	P23(2)	P35(1)
Understanding the Community Partner as Educator	P2(2)	P11(4)	P24(2)	P25(1)	P39(1)
	P3(13)	P15(2)	P27(2)		
	P4(4)	P17(3)	P31(2)		
	P5(2)	P18(3)	P32(1)		
	P6(6)	P19(1)	P33(1)		
	P7(1)	P20(1)			

An important finding in this study is reflected in the disconnect between the embeddedness of service-learning in the CAFS minor and the role of community partners. For instance, faculty teaching in ALS 3404—which implements a different collaborative teaching model than the other two collaboratively taught courses—does not utilize a community partner liaison in course planning and teaching. However, faculty connected with this course referenced fieldtrips to the university farm where a project was being managed by one of the community partners. This interaction with the community partner space is seen as engagement with the community partner, which involves a tour and a service work session, but no deeper engagement

and incorporation in the classroom. This potential shortcoming was noted by Emery: “Outside the classroom...I keep coming back to the field trips to [university farm] but [Community Partner Liaison] wasn’t on many of those trips.” She later added, “I haven’t met any of the partners that have animals on their places...that’s just not been something that has happened at this point.” Similarly, Ellis reflected further on the minimal involvement/engagement of a community partner liaison in ALS 3404.

There was no equity in the connections nor was there communication how it was structured previously. You had to go figure it out. There should be a partner that coordinates at a level and that facilitates some kind of cohesiveness in everything that’s going on. The intentionality is absent. In the absence of [community partner coordination] it really just becomes this chore on the part of the faculty.

Ellis further explained that there is a “tricky balance between structure so everyone knows what’s going on between the three participants [students, faculty, and community partners].” He also shared that an “explicit understanding of what it is we’re doing...what is meant to do and then with that understanding coordinate the education part of it and that would be between the faculty and the community partners.” This lack of understanding of the purpose and significance of the community partner liaison as educator created some shortcomings in the service-learning curricula.

Faculty teaching in ALS 2204 and ALS 4204 presented another view of the community partner as educator. Unlike the case of ALS 3404, the role of the community partner liaison in these two courses was embedded in the planning and delivery of the courses both inside and outside the classroom. In fact, the community partner liaison served an essential role in

facilitating relationships between the university and community. Observations illustrated the nature of understanding interdisciplinary work:

The difference in philosophy and discipline cause tension when addressing real issues of conflict in course content. A challenge experienced by collaborative interdisciplinary faculty, working from different philosophical and disciplinary backgrounds, to discuss real world issue translate into tensions in both course pedagogy and management (P33).

Charley spoke about the trust she feels in the community partners: “I have a relationship with them so if there is a problem they can let me know, I feel trust.” Chris spoke of the importance of the community partner liaison: “I wouldn’t have the same relationships that I have with them [community partners] if it wasn’t for working with [the community partner liaison] both in the classroom, her perspectives, but her relationships with people in the community; to bring them close to the classroom.” Chris explicitly spoke about community partners as “wonderful teachers, they’re wonderful people to work with.” Cameron described the student experience in the core courses: “I think that partnership has been pretty fundamental to the hands-on piece that students get to sample in the intro class as they navigate through. If they choose to do their capstone [project] there, it’s been a win-win.” The connection of the community partners as educators in the field and their roles in facilitating an experiential learning component to the course was demonstrated by the community partner liaison during the Fall 2013 semester. Specifically, service-learning represented an important pedagogical practice implemented in the core courses to facilitate the experience. Cameron shared details on how the community partner liaison contributed to the classroom.

[The] community partner who contributes content to the conversation about what's taking place between them and the students out in the field and the dynamic conversation that's happening out there enriches what we do in the classroom. We have to be more intentional connecting those dots.

Cameron also confirmed that the “community partner [liaison] is truly integrated into two of the courses.” She added: “It's a different perspective than just, say, me talking.”

In terms of practice, the community partner liaison manages student participation at community partner sites as well as the community partner communication with faculty. This individual brings to the classroom the practice of civic agriculture that is place-based. Important to note is that the absence of a community partner liaison in ALS 3404 has created a deficit in the student experience, which is not the fault of faculty teaching in the course. There simply has not been the same guidance or consistency as with the other teaching teams. The outcomes of the integration of the community partner liaison in the teaching teams—not to mention the lack thereof—illustrate the significance of a collaborative teaching model that includes a community partner.

Theme 4: Participation in Sustainable Agriculture Education Programs

The fourth and last major theme that was investigated in this research is participation in sustainable agriculture education programs. This research resulted in findings in three areas: (a) identifying student learning, (b) learning situated in a sustainable agriculture education program, and (c) teaching in a sustainable agriculture education program. The level and participation of faculty and the community partner liaison in the CAFS minor has been moderated by prior iterations of core courses, as well as by the input of CAFS Curriculum Taskforce members during their monthly planning meetings. Faculty viewed their participation in this sustainable

agriculture education program as an important contribution to the land grant mission, as creating a common educational experience among faculty of different disciplines, and as contributing to a more student-centered paradigm. The following three categories are illustrated to further support the theme Participation in Sustainable Agriculture Education Programs.

Identifying Student Learning

Table 19 presents the code matrix for identifying student learning. The code matrix represents groundedness of codes in the data. See Table 6 for detailed instructions for reading the code matrix tables.

Table 19.

Code Matrix: Identifying Student Learning

Data Type	Interview <i>(Primary Document # P1-P8)</i>	CAFS Course Field Note <i>(Primary Document # P9-P20)</i>	CAFS Collaborative Teaching Team Meeting Field Note <i>(Primary Document # P21-P34)</i>	CAFS Curriculum Taskforce Field Note <i>(Primary Document # P35-P38)</i>	CAFS Secondary Data <i>(Primary Document # P39-P45)</i>
Theme:	* Number of Occurrences in Primary Document Shown in Parenthesis				
Participation in Sustainable Agriculture Education	<i>ex: P1(3)</i>				
Category:	P1(3)		P24(3)		
Identifying Student Learning	P2(3)				
	P3(3)				
	P4(2)				
	P5(1)				
	P6(9)				
	P8(5)				

Faculty identified the scaffold assignments and the design process as an enhancement to student learning in the core courses. Given the cross-disciplinary nature of the CAFS minor, learning is also fostered by focusing on experiential learning and service-learning opportunities. As Cameron suggested, “Experience has given them [students] real-world, hands-on opportunity...students get a better learning experience when you put something very applied to what is happening in class.” Other faculty also spoke to the importance of applied practical learning experiences as a platform for student engagement and learning. Edmond summarized the benefits of a combined learning approach:

I think there is a lot to gain, a lot of educational potential...students not only hearing it from the professors but actually going out there [and learning from someone] actually doing it getting their hands dirty...

In addition to incorporating experiential learning opportunities to course design, the importance of an interdisciplinary approach cannot be overstated. Charley stressed how a collaborative learning environment can achieve learning objectives:

Students can... hear different perspectives and insights. They can also learn different languages used around the topic. They get the sense that community food systems are dynamic and so if we are having a discussion as instructors about different topics and not necessarily having consensus about it in a professional way, they can see that this is not something that is easily understood, solved, analyzed.

Learning Situated in Sustainable Agriculture Education

Table 20 presents the code matrix for learning situated in sustainable agriculture education. The code matrix represents groundedness of codes in the data. See Table 6 for detailed instructions for reading the code matrix tables.

Table 20.

Code Matrix: Learning Situated in Sustainable Agriculture Education

Data Type	Interview (Primary Document # P1- P8)	CAFS Course Field Note (Primary Document # P9- P20)	CAFS Collaborative Teaching Team Meeting Field Note (Primary Document # P21-P34)	CAFS Curriculum Taskforce Field Note (Primary Document # P35-P38)	CAFS Secondary Data (Primary Document # P39-P45)
Theme:	* Number of Occurrences in Primary Document Shown in Parenthesis				
Participation in Sustainable Agriculture Education Programs	<i>ex: P1(3)</i>				
Category:	P1(14)	P9(1)	P22(2)		
Learning	P2(7)	P10(2)	P23(1)		
situated in	P3(11)	P15(3)	P24(3)		
Sustainable	P4(5)	P16(3)	P32(1)		
Agriculture	P5(9)	P18(1)			
Education	P6(17)				
	P7(2)				
	P8(2)				

Interviews confirmed the growing importance of sustainable agriculture education. Erin summarized it as follows: “It’s hard to say within the whole university how it all fits but I think

it's a growing concern that people are talking about so I think it is important to have [sustainable agriculture education] be there." It is important to note that respondents linked sustainable agriculture education and systems thinking—and in particular stressed the significance of biological and social systems. As Erin indicated, "I'm learning a lot about sustainable agriculture as a topic so I think that's been great, it really helps me be able to think about the whole system, learning more of the science of those specific things." Additionally, the work being done was valued by collaborative teaching team members. Emery saw her participation in sustainable agriculture education curricula as:

Helping other people...you're watching students but also faculty. You are watching people grow from a personal perspective, professional development; resume building, all that good stuff. You become a better person for it.

Casey further supported the community-based approach of sustainable agriculture education: "I had a sneaking suspicion it was a good idea to get out in your community and work. Now I'm sure of it. Now I'm dead certain it's a good plan." She added that "[Sustainable agriculture education] just isn't straightforward... [it's] a huge biological system...fieldwork is a way to learn how you make sense of those things."

Faculty referenced how prior knowledge could enhance the process of learning in a sustainable agriculture education curricula in connection to applying concepts, practices, and alternative ways of thinking. The importance of the traditional land grant mission was also viewed as relevant for sustainable agriculture curricula. Along those lines, Chris spoke of civic engagement in sustainable agriculture education:

I think questions of justice are a big thing. That is to me what defines sustainable agriculture. I think also we find a way to engage with our civic mission. I think collaboration is natural there.

Faculty noted that since the content being taught crossed several disciplines, they stressed the necessity of creating a common educational experience. There were also similar references to a common agenda or goal for creating interdisciplinary curricula. Throughout the interviews, the researcher heard time and again that, despite the challenges of incorporating diverse disciplinary knowledge and faculty in a community-based curriculum, the excitement about the possibilities of the minor was tangible. Ellis summed it up this way: “The very nature of the attempt creates the space for conversation and in creating the space for conversation puts the seed of thought into everything else you do, so I really do believe that it does have impacts, positive impacts.” Some faculty viewed their participation on the periphery of the holistic student/faculty/community partner experience.

Observational data of ALS 2204 illustrated the significance of faculty work as learning in sustainable agriculture education curricula and the connections to learning situated in sustainable agriculture:

The end of class is spent sitting in a circle in the grass at [community partner site], the collaborating faculty and community partner liaison prepare and hand out the snack and the instructor of record starts discussion by focusing on the questions posed in the van ride over, suggesting that it was hard to hear on the van and she did not want to miss this in the class discussion. Students offer some experiences they have had so far with their field work and the instructor of record starts to make connections with the readings for that week and concepts of historical

significance (P15).

Planning occurs during field trips, where faculty engage in conversation and connect previous experiences and student projects with the changing community partner sites and development of the CAFS minor.

While touring [community partner site] the educators engage in small conversations separate from the tour conversation, focusing on student capstone projects and vision for community partner work (P16).

The significance of learning in the field is enhanced through the participation of the community partner liaison. The activities that faculty design in collaboration with community partners directly links the concepts and ideas of sustainable agriculture curricula situated in civic agriculture spaces.

This field work site visit is much more intentional with connecting the course concepts and purpose of the minor to the space as a venue for civic agriculture. The community partner liaison being part of curriculum design and class implementation can plan for such activities in a way that other community partners cannot (P18).

The collaborative teaching team in ALS 2204 additionally demonstrated the transition of course assignments to career applications after completing the course. This attempt to demonstrate practicality of assignments is conveyed through multiple iterations of the course:

The collaborative teaching team connects the purpose of the students obtaining letters of support for the project proposals from their community partners. This is an explicit attempt to model practical career experiences in a safe environment

(P24).

Teaching in Sustainable Agriculture Education

Table 21 presents the code matrix for teaching in sustainable agriculture education. The code matrix represents groundedness of codes in the data. See Table 6 for detailed instructions for reading the code matrix tables.

Table 21.

Code Matrix: Teaching in Sustainable Agriculture Education

Data Type	Interview (Primary Document # P1- P8)	CAFS Course Field Note (Primary Document # P9- P20)	CAFS Collaborative Teaching Team Meeting Field Note (Primary Document # P21-P34)	CAFS Curriculum Taskforce Field Note (Primary Document # P35-P38)	CAFS Secondary Data (Primary Document # P39-P45)
Theme:	* Number of Occurrences in Primary Document Shown in Parenthesis				
Participation in Sustainable Agriculture Education Programs	<i>ex: P1(3)</i>				
Category:		P10(2)	P21(1)	P35(2)	P42(1)
Learning		P11(1)	P22(2)	P39(2)	P43(1)
through		P12(3)	P23(1)		P44(1)
Experience		P15(1)	P24(2)		P45(1)
		P16(5)	P25(2)		
		P17(2)	P26(1)		
		P18(2)	P27(1)		
		P19(3)	P29(2)		
		P20(3)	P30(2)		
			P33(2)		
			P34(1)		

Observations of ALS 2204 during the Fall 2013 semester provided valuable insights with respect to teaching in a sustainable agriculture education curriculum. Faculty associated with this course implemented a scaffold approach to assignments. Additionally, the course assignments were reading- and writing-intensive, but did not include tests or quizzes. The main course assignments obtained from the ALS 2204 Fall 2013 course syllabus were:

Table 22.

Course Assignments from ALS 2204 Fall 2013 syllabus obtained from P42

Assignment	Quantity	Description
Weekly Writings	8	Critical writing skills and effective communication of civic agriculture and food systems
Critical Reflection Statement	2	Cumulative synthesis of course readings, community partner fieldwork experience, and class activities and discussion into one concise statement
Literature Review	1	Introduce students to the scholarly concept and practical application of Civic Agriculture
Project Proposal	1	Articulates a plan for developing and conducting a research, education, and/or outreach project in collaboration with their ALS 2204 community partner.
Participation	1	Student self-evaluation of participation.
Fieldwork Experience	20 hours	Community development process that is to help guide student learning for civic engagement.

The weekly writings, which were 500 words in length, served as a foundation for teaching critical writing skills and effective communication of civic agriculture and food systems. Students received full credit on these reflective assignments provided that well-established guidelines were followed—including whether they related to the weekly theme. Faculty provided feedback to build capacity to engage in the next step of the scaffold learning experience, which was the development of a critical reflection statement. These 750-word

statements included a cumulative synthesis of course readings, community partner fieldwork experience, and class activities and discussion into one concise statement. Preparing students for the culminating CAPstone course—which required them to design and implement a capstone project for the minor (i.e., the Community Action Project)—was facilitated through a literature review and project proposal paper. Additionally, other activities that are not incorporated into the course grade are also a feature of ALS 2204. These include food life line, which tackles food access/equity issues; food roots, which investigate family food history; and food miles, which consider food chains.

Another aspect of teaching in a sustainable agriculture education curriculum involves the student-centered pedagogical practice implemented in the classroom. Techniques observed throughout the semester include dialogue-based lectures, small group discussions, pair share, and peer review. As described earlier, important instructional opportunities also occur via field trips, which introduce students to the spaces where pedagogical concepts discussed in the classroom are demonstrated in practice. Specific fieldtrip locations during the Fall 2013 semester included community partner venues (e.g., Hale-Y Community Garden, Glade Road Growing, Kentland Dining Services Garden), and other civic agriculture venues (e.g., Virginia Tech Meats Lab, Virginia Tech Animal Barn, and similar facilities). These field trips complement the in-class lesson plans.

Faculty teaching in the course conducted collaborative planning on a weekly basis, during which they developed lesson plans, coordinated field trips and guest speakers, evaluated student work, and assessed the progress of the course. The role of each teaching team member was defined in the week's lesson plan and a time-structured framework was developed. The

course was purposefully designed to make continuous connections between concepts and facilitate student learning.

CHAPTER 5

SUMMARY, DISCUSSION and CONCLUSIONS

The time has come, we believe, to step back and reflect on the variety of functions academics are expected to perform. It's time to ask how priorities of the professoriate relate to the faculty reward system, as well as to the missions of America's higher learning institutions. Such an inquiry into the work of faculty is essential if students are to be well served, if the creativity of all faculty is to be fully tapped, and if the goals of every college and university are to be appropriately defined. (Boyer, 1990, p. 2)

Summary of Study

Sustainable agriculture education is an emerging field of study that includes not only traditional agriculture and life sciences courses, but also a range of diverse fields that are impacting the way we view agriculture education. Thus, this curriculum is increasingly incorporating knowledge and skills from sociology, nutrition, agriculture, education, political science, architecture and planning, and economics. Moreover, opportunities for civic engagement through university outreach and service organizations have been utilizing community-university partnerships to promote volunteer experiences to enhance service-learning curricula. Institutions of higher education—and particularly this nation's land grant universities—are responding to calls for a greater institutional commitment to revitalizing agriculture programs. As evidence of this push, the National Academies of Science (2009) urged the enhancement of agricultural literacy and student recruitment in the field of agricultural sciences.

The Civic Agriculture and Food Systems Minor at Virginia Tech is an interdisciplinary approach to experiential-based curricula that promotes agricultural literacy at an institutional level. The CAFS minor is housed in the College of Agriculture and Life Sciences where a

taskforce of multidisciplinary faculty, institutional and community stakeholders, and students guide growth and development. The CAFS minor is built upon six cornerstones that serve as guiding principles: 1) food security-sovereignty, 2) civic engagement and democratic participation, 3) strong local economies, 4) ecological stewardship, 5) healthy people and communities, and 6) collaborative teaching and experiential learning (Clark et al., 2013). These cornerstones establish a common agenda for the core courses being taught in the minor and represent a path toward teaching agricultural literacy that crosses disciplinary boundaries.

Opportunities are increasing for creating experiential, interdisciplinary degree programs across departments and colleges of agriculture in higher education (Clark et al., 2012, Hammer, 2004). Stakeholders associated with the Civic Agriculture & Food Systems minor at Virginia Tech are in the process of shaping a model program that combines experiential learning, interdisciplinary curricula, and community engagement. The incorporation of interdisciplinarity, collaborative teaching and research agendas, and experiential-based learning into agriculture education are suggested to reach the goal of transformation in agriculture education to maintain pace with the changing global agrofood system and related opportunities for student career success (NAS, 2009). This study reveals one model of teaching and learning in sustainable agriculture education curricula where the courses are designed, taught, and evaluated collaboratively by an interdisciplinary group of faculty. This collaborative teaching model is composed of an instructor of record, collaborating faculty, community-partner, and graduate teaching assistant. Faculty working in this type of teaching model report learning in the areas of disciplinary knowledge and pedagogical practice, and find that the work is rewarding. This finding however does not preclude other models of collaborative teaching and interdisciplinary teaching that are occurring in higher education.

This study approached the research design with the perspective of assessment as a method for understanding a case such as an educational program in higher education. The lens of assessment in this study could enhance faculty, community and university stakeholder, and administration's participation and acceptance of the current paradigm shift occurring at Virginia Tech. Assessment as a lens to inquiry enhanced this study by enabling the findings to support the resource intensive needs for faculty teaching and learning in sustainable agriculture education curricula. This study supports faculty participation in collaborative and interdisciplinary work by illustrating the learning outcomes of engagement and the impact on the culture of the institution. This shift toward a student-centered approach to teaching and learning is accompanied by alternative pedagogical practices that stretch the traditional perspective of the role of faculty and student both in and outside of the classroom. Faculty in this study learned new pedagogical practices from interactions with other faculty teaching and learning in the courses, and developed an appreciation for other disciplinary practices. This finding resonates with Lattuca's (2002) description of disciplinary positions which frame faculty assumptions, practices, processes, values, and relations to other disciplinary perspectives in their everyday work.

Faculty work as learning incorporated into research agendas within the scholarship of teaching and learning is an opportunity for agriculture education to enhance understanding of social practice and disciplinary cultures as context that affects every day work experience. In order for institutions of higher education to fully engage in the shifting paradigm toward a student-centered approach, a change in understanding the learning process and the desirable outcomes for both students and faculty is necessary. This involves the development of a framework in higher education for understanding faculty work as a learning process—one that

also values the challenges and benefits of conducting interdisciplinary collaborative research, teaching, and extension/service. Scholarship in the area of faculty work as learning illustrates the positive impacts on classroom engagement and effectiveness, as well as the larger scholarly community (Lattuca, 2005). This type of research agenda where learning outcomes of all actors in the educational experience are revealed can establish a need for engagement in collaborative work. Collaborative work, when viewed as a social learning experience, creates value for administration in supporting faculty who participate within the organizational structure with the realization that training and development are occurring at the same time. This study, and ones like it, can illustrate the benefits of viewing collaborative work as faculty development.

In this study a qualitative research methodology was employed via a case study approach to explore a sustainable agriculture education minor at a land grant university. The purpose of this study is to explore the experience of faculty and community-partners teaching and learning in sustainable agriculture education curricula. The methods of data collection included semi-structured interviews, participant/observer field notes, and secondary data analysis. Drawing on a sociocultural learning framework informed by Fenwick (2000, 2003) and Lattuca (2001), a single embedded case study informed by Yin (2012, 1997) guided the design and implementation of this study. The main unit of analysis is faculty who were teaching/learning in the CAFS minor in the College of Agriculture and Life Sciences at an LGU during the Fall 2013 semester. Additionally, embedded subunits of analysis comprised of other collaborative alliances engaged in the minor: faculty-faculty partnerships, faculty-community partners' partnerships, and faculty-student partnerships. Purposeful sampling was implemented for the selection of participants based on membership in the CAFS Taskforce and having a collaborative teaching team role in one of the four core courses in the minor.

Faculty and a community-partner (all of whom were assigned pseudonyms to protect their identity) participated in semi-structured interviews to allow for candor. Interviews also allowed the researcher to collect historical information and gain essential insights in instances when the participant could not be observed directly (Creswell, 2009). The researcher also acted as participant-observer throughout the Fall 2013 course and collaborative teaching team meetings, ALS 2204, Introduction to Civic Agriculture, and the CAFS Curriculum Taskforce meetings, in order to enhance data collection by observing and recording information. Secondary data collected through use of written documents created in the CAFS Taskforce Assessment workshop and course syllabi informed the process.

Discussion

Research Sub-question #1: How do faculty understand and participate in collaborative teaching?

Lattuca and Creamer (2005) defined collaboration amongst faculty within and across disciplines as “a social inquiry practice that promotes learning” (p. 5). In this study, faculty participating in the CAFS minor reported that they learned not only disciplinary knowledge from collaborative teaching experiences, but also pedagogical practices, professionalism as faculty, and strategies to navigate administrative structures and engage in productive collaborative work with others. Faculty participating in teaching and learning in the CAFS minor collaborated with faculty within and across disciplines, creating a space for learning and developing value of other disciplinary knowledge and understanding of complex issues. Faculty acknowledge their discipline in collaborative work. Navigating the new environment that they create, “deep experience of whole-persons acting” (Lave, 1988, p. 190) illustrate the nature of experience coupled with person, activity, and setting as conditions for learning. These findings support an

argument for collaborative work to be viewed as faculty development and the need for resources that would naturally be allocated to training and development.

For the Fall 2013 core course, faculty and the community partner created common assignments with corresponding guidelines and rubrics, content and class discussion prompts, and activities to facilitate student learning. These activities support research findings that recommend a more integrated approach to collaborative teaching where multiple perspectives (even competing viewpoints) can be shared and discussion can occur to address complex issues (Wenger & Hornyak, 1999). Integrating multiple pedagogical practices in the classroom creates space for faculty to learn new teaching approaches. Furthermore, creating assignments that span disciplinary understandings to solve complex issues that are not easily understood individually foster new perspectives toward teaching and learning in sustainable agriculture education. This type of inquiry creates an environment for asking new questions and a support structure for navigating complex systems, such as our agrofood system, in course content and research agendas.

To achieve a deeper understanding of content and connect programmatic goals and student learning outcomes, an interdisciplinary approach to collaborative team teaching is recommended. The curriculum should be intentional with set objectives, and feature a “road map” and specific directions/instructions on how to navigate the route. Faculty voiced their perspectives on the need for clarity in teaching structure in the CAFS minor. Multiple outcomes of collaborative work among faculty were revealed—the most impactful being building relationships with faculty outside of their own disciplines, enhanced teaching practice, expanded research agendas, interdisciplinary/collaborative grant opportunities, outreach opportunities, and challenge to current thought and practice. Collaborative work illustrates “cognition and the

social activity embedded...through interactions with others, with the tools of different communities of practice, and in a variety of contexts” (Lattuca, 2002, p. 719). This study found that faculty learn through interactions with other faculty, community partners, and students that are part of the teaching and learning process in the CAFS minor. Faculty bring with them their disciplinary perspectives and understandings, teaching practices, assumptions, values, and language to collaborative work (Lattuca, 2002). Collaborative teaching creates space for multiple perspectives and social practice to blend. This study found that when faculty collaboratively design, teach, and evaluate sustainable agriculture education curricula, learning outcomes are recognized by faculty that span their roles as educator, researcher, and agent of service.

This study found that faculty learn how to work together through collaboration, developing “new ways to perceive and understand the phenomenon of interest to them” (Lattuca & Creamer, 2005). In particular, the four C’s were found to be essential for successful collaborative teaching: communication, continuity, clarity, and capacity. However, participation tended to be moderated by disciplinary understandings of teaching practice and content of courses. Social practice of faculty from different departments and disciplines affected decision-making, where faculty voiced concern toward the process. Common purpose and pedagogy, and trust were also found to be important in the collaborative teaching experience. As noted above, communication among faculty is an especially important concept to be successful in a collaboratively taught course, which emphasizes the concept of language as a cultural tool in the learning process (Lattuca, 2002). In this study faculty shared that they felt they had to almost translate to others their disciplinary understandings. Common understanding or consent, even if

in disagreement with other disciplinary languages, is a starting point to clearly articulate across the institution a model for collaborative practice.

Faculty teaching and learning in the CAFS minor found that collaborative teaching was complex and experienced some challenges such as: clarity of roles and responsibilities of teaching team members, time management, equity, communication of the collaborative teaching model to students, and understanding common pedagogical practices. It was also observed that lack of structure around allocation of resources and equity among faculty and their respective departments that support collaborative teaching efforts created tension in CAFS Curriculum Taskforce meetings. Complexity associated with navigating multiple departmental-level administrations were identified in ownership and use of the core courses taught in the minor, departmental teaching credit and misconceptions of allocated funding, and allocated time for teaching in the minor included in the teaching load for each faculty. A standard teaching team model for the CAFS minor would communicate the need for resources and flexible reporting structures to college and departmental administration. These findings further support the role of institutional culture and how faculty work with their own understandings and social practice in the larger community. Navigating these cultural differences is complex; collaborative teaching can serve as a gateway to collaboration across the institution further enhancing the mission and strategic plan.

The inclusion of the community partner liaison in the collaborative teaching model and the CAFS curriculum taskforce was found to facilitate the process of embedding service-learning as a common pedagogical practice in the field and classroom. This study gave insight into the student experience, as viewed by faculty. This experience was seen as enhanced by the participation of the community partner as an educator instead of serving as a mere site visit or

service coordinator. The community partner also lessened the management workload of faculty that is natural when implementing a service-learning component. The community partner was able to bridge learning in the field with learning in the classroom. Connecting theory and concepts introduced in course readings and classroom discussions to student experiences—also supported by critical thinking exercises and intensive writing assignments—was shown to achieve student learning goals of the minor, as well as enhance their ability to communicate the concepts of sustainable agriculture and food systems in a meaningful manner. Thus, the community partner liaison was confirmed to be an integral member of the collaborative teaching team committed to increasing agricultural literacy.

Research Sub-question #2: How do faculty understand and participate in interdisciplinary teaching?

Within the framework of this study, interdisciplinarity was conceptualized according to Lattuca (2001) as enhanced through a “non-disciplinary” perspective by faculty and administration in higher education. Interdisciplinarity occurs on a continuum of activity. On one end is the “informal communication of ideas such as might occur in a conversation between colleagues from different disciplines; on the other end is formal collaboration, such as research or teaching teams comprised of one or more faculty from different disciplines” (Lattuca, p. 712). A reconceptualization of interdisciplinarity that includes multiple knowledge perspectives and methods, as well as embodies civic-based activities, adds to the impact of interdisciplinary teaching practice. As this study described, the CAFS minor is an interdisciplinary curriculum incorporating collaborative teaching. When the practice of interdisciplinary teaching was discussed in participant interviews, faculty acknowledged the importance of having a field expert with his or her disciplinary knowledge as part of the practice model. In other words, faculty

agreed that it was ineffective to expect a single faculty member to teach outside his or her disciplinary field, even with access to literature in other disciplinary fields as a resource. Instead, faculty viewed the collaboration of interdisciplinary faculty sharing their disciplinary knowledge and understanding of the course content as essential to addressing complex social issues in the agrofood system. Meaningful teaching and learning occurs when faculty of different disciplinary backgrounds work together toward a common purpose. When viewing interdisciplinarity through a sociocultural lens, disciplines become cultural tools with individual thinking and activity influenced by the discipline in which the individual is situated (Lattuca, 2003). This approach to interdisciplinary teaching in the CAFS minor creates a model for teaching and learning in sustainable agriculture education as a collaborative process that incorporates multiple disciplinary understandings from a group of faculty to solve complex problems by creating and answering new questions the inquiry exposed.

As defined by Lattuca (2009), an academic discipline is more than just the subject matter and methodologies implemented in research and education; it is a culture of shared knowledge and understanding. “The real impediment to interdisciplinarity is not academic departments but the attitudes, beliefs, and values of gatekeepers, such as editorial board members and reviewers who police disciplinary boundaries” (Lattuca & Creamer, p. 6). Faculty teaching in the CAFS minor were highly motivated to teach in the core courses, which influenced reading literature outside of their own disciplines. Lattuca and Creamer argued that “discipline[s] [are] the dominant force and the central source of identity for faculty members” (p. 6). This view lends insight into the social and cultural implications of interdisciplinary work, whereby participating faculty bring disciplinary knowledge, practices, and beliefs that affect the overall outcome of the experience. As evidenced by this study, the faculty who took part in interdisciplinary teaching

gained new teaching strategies and insights, were intellectually stimulated, and were more reflective in terms of their own learning and their students' learning (Lattuca, 2001; Thorburn, 1985). Faculty teaching and learning in the CAFS minor described a gain in disciplinary knowledge and expressed value to that learning experience, relating it to becoming better contributors to the university as faculty members. The reflective practice was quite evident in the interviews, where critical reflective praxis was expressed as they described their experiences teaching and learning in interdisciplinary curriculum. Through analysis of the definitions proposed by faculty and the community partner, the following composite definition of interdisciplinary teaching in practice was developed:

A process of integrating multiple disciplinary solutions in a systems approach, where the significance of the individual is embraced, establishing a common agenda for creating new understanding to solve complex issues.

Both the faculty and the community partner viewed interdisciplinary teaching as a process that relies on transparency in motive and method. Only then can a team move forward to build a truly interdisciplinary approach to teaching and learning in sustainable agriculture education. Importantly, teaching in an interdisciplinary curriculum creates opportunities for faculty to learn more about the disciplinary perspectives of colleagues in other departments. Thus, the learning experience for both faculty and students was highly tied to the interaction between faculty members of different disciplines. According to some participants, however, an interdisciplinary approach is not without some potential challenges, including balancing competing or contradictory knowledge sources. Nonetheless, participants highly valued the sharing of knowledge that occurs through collaboration and interdisciplinary teaching and research opportunities.

Interdisciplinary teaching and learning and research agendas are incorporated in the strategic plan for the institution and frequently included in grant funding calls. Incorporation of interdisciplinary teaching in courses serves as a conduit for connecting faculty of different disciplines and departmental homes in a common work where the outcomes of learning to work in an interdisciplinary environment can increase the amount of interdisciplinary work being done across the institution. Interdisciplinary practice in teaching and learning and research, when seen as a rewarded practice by administrators and organizational structures, can enhance the scholarship and engagement of the institution.

Research Question #3: How do faculty understand and participate in service-learning as a pedagogical practice?

Within the framework of this study, service-learning is viewed as a non-formal approach to education that is becoming a widely-used pedagogy in higher education (Jacoby, 2006). A praxis of connecting academia with community engagement “within a framework of respect, reciprocity, relevance, and reflection” (Butin, 2010, p. xiv) guides the CAFS minor curriculum. This is illustrated in the membership of the CAFS Curriculum Taskforce and the collaborative teaching teams in the four core courses taught in the minor. Importantly, the community partner liaison both facilitates student experiences in the field and teaches in the classroom. Ambiguity exists, however, as to how service-learning is defined and how it should be practiced in institutions of higher education. This ambiguity was expressed by faculty teaching in the CAFS minor. Specifically they spoke of a variety of issues, ranging from struggles with the critical reflection of this pedagogical practice to complete uncertainty about the educational goals and learning outcomes of a service-learning component. Nonetheless, uncertainty can also lead to opportunities to define what a model of service-learning should look like for the CAFS minor

(or, indeed, any program). Criteria for service-learning were established by Duncan and Kopperund (2002) as possessing academic rigor, developing critical reflective thinking, and increasing student's sense of civic responsibility. These criteria are suggested as important by faculty teaching and learning in the CAFS minor. Moreover, some faculty spoke about the importance of service learning in terms of upholding the land-grant mission—which heightens the importance of building academic rigor into any learning opportunity that occurs in the field.

Critical and reflective thinking and writing is practiced throughout the CAFS curriculum, which raised questions for faculty when they spoke about the service-learning component. Most classroom-based learning activities have well defined objectives and desired outcomes, transferring this structure to field-based activities was challenging for some teaching team members. Thus, teaching team members spoke of the importance of clearly defining steps to achieve the desired goal, realize results, and measure the outcomes of service-learning (Duncan & Kopperund, 2010). As an example of how this goal was implemented for the CAFS minor, the Fall 2013 collaborative teaching team included the input of the community partner in evaluating student participation and formalized grading criteria. This practice legitimized the community partner as an educator whose insights and opinions were important to the course curriculum.

The praxis of incorporating a service-learning component in experiential learning courses bridges theory with practice; insofar as the CAFS minor is concerned, this appears to be a work in progress. In other words, teaching team members did not share one common understanding of service-learning. Their descriptions varied from fieldtrips facilitated by faculty and community-partners where a group service and tour are done on site to the incorporation of critical reflective classroom activities connecting experiences in the field with concepts learned in the classroom.

As described by Ward and Moore (2010), service learning is a broad, but potentially fruitful, continuum—ranging from volunteerism (i.e., the receiver of service benefits) to student internships (i.e., the student receives the benefits). The core courses in the CAFS minor incorporate a service-learning component to the curriculum that falls in the mid-range where both receiver of service and the student benefits. Service-learning as practiced in the CAFS minor is a reciprocal process, beneficial to the student, community, faculty, and institution. The addition of faculty and institution to the receivers of benefits illustrates the need to demonstrate tangible outcomes not only in respect to student learning but to the greater institution. These benefits can accompany a cost-benefit analysis of funds allocated toward educational programs that employ multiple faculty and community partners in the process.

Teaching team members also spoke of challenges to the practice; these included meaningful student participation and engagement, management of community partners and sites, and the participation of collaborating faculty. A way to alleviate the management work load of faculty participating in this type of approach to experiential learning in practice is to incorporate the community partner into the teaching team as an educator in the process. This incorporation has shown to be instrumental in achieving student learning outcomes in the core courses. It was revealed as a missing link in the one specific course teaching team that did not receive full support of a community partner in the design, teaching, and evaluation.

Research Question #4: What sociocultural outcomes might result from faculty learning within this sustainable agriculture education program?

The practice of sustainable agriculture education is based on the work of a number of scholars and practitioners—many of whom are implementing a social constructivist pedagogy that is experiential based (Clark, Byker, Niewolny, & Helms, 2013; Hammer, 2004; Parr et al.,

2007; Parr & Van Horn, 2006; Roberts & Ball, 2009). The CAFS minor embraces a learner-centered environment as “a move from a passive to an active learning environment” (Jungst, Licklider & Wiersema, 2003, p. 70). This shift in pedagogy is enhanced through use of dialogue-based methods and the increasing incorporation of pedagogical practices where the role of educator resembles that of a facilitator and active participant in the learning. The CAFS minor curriculum fosters the cultivation of a civically engaged and socially responsible undergraduate through service-learning and volunteerism opportunities that result in authentic educational engagement (Strand, Marullo, Cutforth, Stoecker, & Donohue, 2003). Similarly, the design and intent of the CAFS minor reflects the land-grant mission of Virginia Tech with community engagement enhancing faculty-student interactions in the curriculum.

As reported by study participants, learning focuses on experience and participation within a diverse disciplinary environment. It stresses interrelationships, not just interactions, as a cornerstone for efficacy. Faculty and the community partner liaison spoke of sustainable agriculture as a complex topic wherein traditional specialized approaches were no longer sufficient. Faculty referenced prior knowledge in the process of learning in sustainable agriculture education curricula in connection to applying concepts, practices, and alternative ways of thinking into other work. The unit of analysis is then transformed from the individual to the person-in-activity, navigating a mediated social world (Lave, 1988; Lave & Wenger, 1991). Lave and Wenger argued that learning is a “historical production, transformation, and change of persons... [where] participation is always based on situated negotiation and renegotiation of meaning in the world... [implying] understanding and experience are in constant interaction” (p. 51-52). Experience as learning as seen through the lens of participation in a socially-situated process again confirms the notion that learning is an embodied activity. The participation of the

CAFS faculty and the community partner liaison in the teaching and learning was moderated by prior iterations of core courses and interactions in the CAFS Curriculum Taskforce planning meetings. There was uniqueness to the approach—faculty from different disciplines teaching together in community-based curricula. Another important aspect of teaching in sustainable agriculture education is the student-centered pedagogical practice implemented in the classroom. Observed techniques throughout the semester included dialogue-based lectures, small group discussions, pair share, and peer review. As described earlier, important instructional opportunities also occurred via field trips, which introduce students to the spaces where pedagogical concepts discussed in the classroom are demonstrated in practice.

Faculty viewed their participation in sustainable agriculture education as an important way of engaging with the land-grant mission, creating a common educational experience, and transition to a student-centered paradigm. The overarching purpose of sustainable agriculture education in the CAFS minor is to promote agricultural literacy. Sustainable agriculture education aims to teach students how to interpret multiple perspectives, and make context appropriate decisions while solving problems. Faculty and community partners teaching in the CAFS minor enhanced the curriculum in a number of ways: promoting agricultural literacy, skill development in questioning and analyzing contextual issues; implementing an approach to understanding agricultural and human systems; addressing issues through community-based problem solving and action; and becoming civically engaged in the community food system.

Implications for Practice

Principles of Sustainable Agriculture Education

Twelve overarching principles were identified in the design and implementation of sustainable agriculture curricula in the Civic Agriculture and Food systems minor: (1) common

agenda/goal, (2) common educational experience, (3) student-centered, (4) systems-approach to solving complex problems, (5) interdisciplinary process of development/practice, (6) individual is as significant as content/disciplinary knowledge, (7) experiential (hands on, reflection in/on experience), (8) community-based education/community-partner as educator, (9) promotes civic engagement, thereby upholding the land-grant mission, (10), faculty work as learning/development; (11) promotes scholarship, and (12) it is value added—complementary to traditional agriculture education, not a substitution. The first principle prioritizes a need for a common agenda for faculty to work toward in developing the educational experience. The common agenda for the CAFS minor involves creating a learning environment for agricultural literacy. The purpose is not to train farmers in the production and science of the industry, but to complement a diverse array of majors. To implement this common agenda of agricultural literacy a common educational experience was created through common course structure and pedagogical practice. Curriculum development at both the course and CAFS minor level were achieved through collaborative teaching teams in each core course, as well as through the interactions of the CAFS curriculum taskforce, which meets monthly and is made up of stakeholders representing faculty, institutional and community stakeholders and students. The curriculum and pedagogical practices embraced by faculty teaching in the minor embody the growing shift in higher education toward a more a student-centered paradigm. Complex agrofood systems issues, from a local, regional, and global scale, were addressed in the CAFS minor by taking a systems approach to problem solving. This approach was exemplified through interdisciplinary curricula, where multiple disciplines of the natural and social sciences were blended to foster holistic inquiry into social, economic, and environmental topics. Also

important to note is that each core course in the CAFS minor was continuously changing to incorporate improvements based on ongoing assessment measures.

The curriculum was experiential-based, wherein a hands-on approach to learning and reflection in and on experiences in the field and classroom could be realized through service-learning as a pedagogical practice. In this instance, service-learning involved community partners as educators in community-based learning experiences. Preparing students for the culminating CAPstone course—which required them to design and implement a community action project—was facilitated through a literature review and project proposal paper. This learning process fostered community engagement and illustrates the land-grant mission of teaching, research, and outreach/service to society.

This study identified a number of valuable outcomes of faculty collaboratively teaching in this interdisciplinary minor: professional development and learning of diverse pedagogical practices, enhanced disciplinary knowledge, and an enhanced ability to navigate departmental and college-based administrative structures, to name just a few. Importantly, scholarship was identified as an important outcome of participation in the CAFS minor. Faculty, students, and community partners have all delivered conference presentations, conducted funded research projects, submitted journal publications, and have engaged in professional ventures created through collaborative work. Sustainable agriculture education is an emerging field of study and should be taught in conjunction with traditionally established fields.

Collaborative Teaching Model

The collaborative teaching model for the CAFS minor has undergone modifications during the four iterations of its core courses. Insights into the best practices for teaching and learning in sustainable agriculture curricula will inevitably enhance our understanding of collaborative

teaching in an interdisciplinary experiential-based curriculum. The collaborative teaching team could consist of the following members: instructor of record, collaborating faculty, community partner liaison, and graduate teaching assistant. The individual roles of the collaborative teaching team members enhance the teaching and learning process and is communicable to university administration when requesting funding and time to work in this manner. Research that reveals best practices and established a clear model for collaborative teaching based on the programmatic goals and learning outcomes specific to SAE programs will enhance the ability and opportunities for faculty to participate in this innovative teaching practice. Clear roles and outcomes for participation in collaborative teaching communicates value/need for funding to administration. A model for collaborative teaching that can be shared to navigate administrative structures can enhance the ability of the institution to learn outside of the silos. Also, a clear model for collaborative teaching based on programmatic goals and learning outcomes allows for seamless reporting to accreditation organizational structures.

Service-Learning as Critical/Reflective Pedagogy: Criteria for SL in the Classroom

Service-learning in higher education has become implemented in a variety of ways—from volunteerism opportunities in the field, to classroom-based service-learning experiences, to internships/apprenticeships. The following criteria illustrated in table 23 describe practices of service-learning implemented in the CAFS minor. These criteria are seen to be important for implementing service-learning as a pedagogical practice in sustainable agriculture education curriculum in this case. These criteria can serve as a guide to scaffold student learning in community-based settings where the goals of service-learning are desired. These eight criteria were developed through analysis of course syllabi, observed classroom practice in the ALS 2204

core course, and the practices faculty shared as critical to service-learning in the interview transcripts.

Table 23.

Criteria for Service-Learning in the Classroom

Steps to Service-Learning Curricula in the Classroom:

1. Introduce Service-Learning: Purpose and Significance
 - a. Assignments Embedded
 - b. Discussions Embedded in Curricula
 2. Community Partner Liaison: Participation in Course Planning, Teaching, and Service
 3. Student-Community Partner Relationship Building
 - a. In-Class Introductions/Guest Speakers
 - b. Field Trips to Community Partner Locations
 4. Learning Contracts: Student-Community Partner Agreement & Expectations
 5. In-Class Discussion Groups: Reflection & Dialogue
 6. Written Critical Reflections: Connecting Course Concepts to Experience
 7. Evaluation: Community Partner Evaluates Student Performance
 - a. Course Grade Associated with Performance
 8. Capstone Project or Undergraduate Research
 - a. High Impact Practices
 - b. Connect to Institutional Practice
 - c. Participation Builds Toward Project or Outcome
-

The use of criteria for best practices to establish a common educational experience raises service-learning to a level of academic rigor that can be fully appreciated by faculty across the institution. Legitimizing the practice of community-based and service oriented pedagogy creates an argument for the integration of such in higher education. Faculty recognize that service has been a part of the land grant mission from a historical and organizational perspective, the

incorporation of service into scholarship and teaching practice will further enhance the ability to bring community engagement to the forefront of faculty work.

Implications for Research

This study utilized a sociocultural approach to investigate faculty-work-as-learning involving faculty participating in sustainable agriculture education at a land grant university. The inclusion of interdisciplinary and experiential curriculum facilitated by collaborative teaching teams is a unique model for fostering agricultural literacy in higher education. The embedded case study focused on faculty and a community partner liaison who engaged in collaborative teaching, interdisciplinary teaching, service-learning and sustainable agriculture education programs. Implications for additional research in sustainable agriculture education are suggested as follows.

The literature is currently lacking in studies that target community partners who are engaged in service-learning as a community educator, and who facilitate the student experience in the field. Thus, a suggested avenue for future research would investigate the roles and outcomes of participation of a “community intellectual/practitioner” as an educator, thereby (presumably) establishing the value of service-learning from a “non-academic” as standard pedagogical practice for experiential curricula. Faculty work as learning, as a topic of inquiry, is one of importance emphasized by the shift occurring in higher education and the change in pedagogy and culture. How faculty learn in this changing environment needs to be addressed if the academy and professoriate are to continue to develop with the changing needs of a global society. Specifically, faculty teaching and learning in the emerging field of sustainable agriculture have the timely opportunity to be on the forefront of the scholarship of teaching and learning. This opportunity is illustrated by the ongoing scholarship of the Civic Agriculture and

Food systems minor and other sustainable agriculture programs across the nation which have been illustrated in this study. Additionally, the researcher suggests the need for further insights into the administrative functions either promoting or hindering collaborative teaching, interdisciplinary work, and community-based learning for engagement in higher education. Such studies could reduce barriers to the incorporation of such practice models. Finally, a more thorough assessment of student learning in sustainable agriculture education is necessary. To do this, collaboration of colleges of agriculture education with support offices of assessment and evaluation and support centers for instructional design and research in developing research agendas that incorporate teaching and learning is suggested. An assessment framework including qualitative and quantitative methods where the learning experience of students is fully explored during undergraduate studies as well as follow up on student achievements after graduation can build a case for the relevance of alternative approaches. Embedding assessment into sustainable agriculture education curricula, specifically focusing on faculty work as learning, is important for administrative leadership to understand the context that they are making decisions within.

Conclusion

This study explored a Civic Agriculture and Food systems minor at a land grant university in Southwest Virginia. The unit of analysis was faculty teaching and learning via interdisciplinary and collaboratively taught courses, as well as the interaction of faculty with other faculty, community partners, and students. This study was guided by an overarching question: From the perspective of sociocultural learning, how do faculty learn within a sustainable agriculture education program at a land grant university? The theoretical framework

that supported the research design, implementation, and analysis was comprised of a sociocultural learning approach informed by Fenwick (2000, 2003) and Lattuca (2001).

This study found that faculty teaching and learning in experiential, interdisciplinary, and community-based curricula benefited in a number of important ways. First, they upheld the land-grant mission of their institution by promoting community engagement, experiential learning, and interdisciplinary collaboration toward teaching and scholarship. Second, faculty learned disciplinary knowledge from colleagues in other departments, which enhanced their teaching/learning experience. Third, they were able to hone their pedagogical practices via the collaborative teaching model. Fourth, they learned how to better navigate administrative and institutional organizational structures. Finally, these faculty members were able to work with colleagues of different disciplinary perspectives and cultures. Additionally, faculty members were able to participate in an emerging pedagogical practice where service-learning and community-partners-as-educators were embedded in the curriculum, which enhanced their professional development. In short, the faculty lauded the experience as contributing to the mission of the institution through doing “good” work; as engaging in meaningful ways with cross-departmental colleagues, thereby creating opportunities for interdisciplinary collaboration in teaching, research, and extension; and promoting agricultural literacy as a valuable experience to undergraduate education. Significance of this study is recognized as the first to describe faculty understanding and participation in a sustainable agriculture education program; current SAE scholarship centers on the exploration of student experiences and learning outcomes. In addition, this study could enhance the understanding of interdisciplinary & collaborative teaching encouraging faculty and university leadership to integrate high impact practices such as service-learning in agriculture education. This study contributes to the understanding of

assessment as a methodology. The benefit of this type of inquiry to institutions is to gain an understanding of the context that decision makers are working within. And also, by emphasizing faculty work as learning as critical in regards to understanding the factors and contexts that promote and sustain faculty learning, building upon faculty work as learning scholarship. The practices of faculty teaching and learning in the CAFS minor align with the mandate from the National Academy of Sciences, which calls for teaching agricultural literacy as a means to recruit students in agriculture education programs and enhance the career success of graduates.

REFERENCES

- Aaker, J. (2007). *The Heifer Model: Cornerstones values-based development*. 1st ed., Little Rock, AR: Heifer International.
- Allen, P. (2004). *Together at the table*. University Park: Pennsylvania State University Press.
- Adamek, M., Alter, T.R., Jordan, N.R., Peters, S.J., (2005). *Engaging Campus and Community*. Kettering Foundation Press: Dayton, OH.
- Antonio, A. L., Astin, H. S., & Cress, C. M. (2000). Community service in higher education: a look at the nation's faculty. *The Review of Higher Education*. 23(4), 373-397.
- Austin, A.E. (2010). The emerging movement. In Fitzgerald, H.E, Burack, C., Siefer, S.D. (Eds.), *Engaged scholarship: Contemporary landscapes, future directions* (3-8). Lansing, MI: Michigan State University Press.
- Austin, A. E., & Beck, J. P. (2010). Integrating outreach and engagement into faculty work. In Fitzgerald, H. E., Burack, C., & Seifer, S. D. (Eds.), *Engaged scholarship: Contemporary landscapes, future directions* (pp. 235-250). East Lansing, MI: Michigan State Press.
- Association of American Colleges and Universities and the Carnegie Foundation for the Advancement of Teaching (AACU). (2004). A statement on integrative learning. Association of American Colleges and Universities and the Carnegie Foundation for the Advancement of Teaching.
- http://www.carnegiefoundation.org/dynamic/downloads/file_1_185.pdf.
- Bailey, L.H. (1908). *The state and the farmer*. Danvers: General Books LLC.
- Battisti, B.T., Passmore, C., & Sipos, Y. (2008). Action learning for sustainable agriculture: Transformation through guided reflection. *NACTA*, 52, 23-31.

- Berger, P. & Luckmann, T. (1967). *The social construction of reality: A treatise in the sociology of knowledge*. New York: Anchor.
- Boyer, E. L. (1990). *Scholarship reconsidered: Priorities of the professoriate*. San Francisco, CA: Jossey Bass.
- Boyer, E. L. (1996). The Scholarship of Engagement. *Bulletin of the Academy of Arts and Sciences*, 49(7), pp.18-33.
- Boyer, E. L. (1997). *Scholarship assessed: Evaluation of the professoriate*. San Francisco, CA: Jossey Bass.
- Brooks, J.G., Brooks, M.G. (2001). *In search of understanding: The case for constructivist classrooms*. New Jersey: Merrill Prentice Hall.
- Butin, D.W. (2010). *Service-learning in theory and practice*. New York: Palgrave Macmillan.
- Byrne, J.V. (2000). Engagement: A Defining Characteristic of the University of Tomorrow. *Journal of Higher Education Outreach and Engagement*. 6(1),13.
- Camp, W.G. (2001). Formulating and evaluating theoretical frameworks for career and technical education research. *Journal of Vocational Education Research*. 26(1), 4-25.
- Chapin, F.S., Zavaleta, E.S., Eviner, V.T., Naylor, R.L., Vitousek, P.M., Reynolds, H.L., Hooper, D.U., Lavorel, S., Osvaldo, E.S., Hobbie, S.E., Mack, M.C., Diaz, S. (2000). Consequences of changing biodiversity. *Nature*. 405, 234-242.
- Charmaz, K. (2006). *Constructing grounded theory: A practical guide through qualitative analysis*. Thousand Oaks, CA: Sage Publications.
- Charon, J. (2009). Symbolic interactionism as a perspective. In J. Charon, *Symbolic interactionism: An introduction, an interpretation, an integration* (pp. 28-57). Upper Saddle River, NJ: Pearson.

- Clark, S., Byker, C., Niewolny, K., Helms, J. (2013). Framing an undergraduate minor through the civic agriculture and food systems curriculum. *North American Colleges and Teachers of Agriculture*, 57(2), pp.56-67.
- Cohen, J.E. (2005). Human population grows up. *Scientific American*. 9, 48-55.
- Colasanti, K., Reau, B., Wright, W., (2009). Extension, the Land-Grant Mission, and Civic Agriculture: Cultivating Change. *Journal of Extension*. 47(4).
- Colby, A., Ehrlich, T., Beaumont, E., Stephens, J. (2003). *Educating citizens: Preparing America's undergraduates for lives of moral and civic responsibility*. San Francisco: Jossey-Bass.
- Creswell, J.W. (2013). *Qualitative inquiry & research design: Choosing among five approaches* (3rd ed.). Thousand Oaks, CA: Sage Publications, Inc.
- Cutforth, N., Donohue, P., Marullo, S., Stoecker, R., Strand, K. (2003). *Community-Based Research and Higher Education: Principles and Practices*. Jossey-Bass: San Francisco, CA.
- Daniels, H. (2008). *Situated action and communities of practice*. In H. Daniels, Vygotsky and research (pp. 91-114). New York, NY: Routledge.
- Delate, K. (2006). Incorporating organic and agroecological approaches into the university curricula: The Iowa State University graduate program in sustainable agriculture. *Horttechnology*, 16(3), pp. 445-448.
- Denzin, N.K., & Lincoln, Y.S. (2000). The discipline and practice of qualitative research. In Denzin, N.K. & Lincoln, Y.S. (Eds.), *Handbook of qualitative research Second Edition*. (pp. 1-29). Thousand Oaks, CA: Sage Publications, Inc.
- Dewey, J. (1938). *Experience and education*. New York: Simon and Schuster.

- Duncan, D., Kopperud, J., (2008). *Service-Learning Companion*. Houghton Mifflin Company: Boston, MA.
- Dryzek, J. (2005). *The politics of the earth*. Oxford: Oxford University Press.
- Erlandson, D.A. (2012). Naturalistic evaluation. In Secolsky, C. & Denison, B. (Eds.), *Handbook on measurement, assessment, and evaluation in higher education*. (483-499). New York, NY: Routledge.
- Fenwick, T (2000). Expanding conceptions of experiential learning: A review of the five contemporary perspectives on cognition. *Adult Education Quarterly*, 50, pp.243-272. doi: 10.1177/07417130022087035.
- Fenwick, T. (2003). *Learning through experience: Troubling orthodoxies and intersecting questions*. Malabar: Krieger Publishing Co.
- Francis, C.A., Lieblein, G., Breland, T.A., Salomonsson, L., Geber, U., Sriskandarajah, N., & Langer, V. (2008). Transdisciplinary research for a sustainable agriculture and food sector. *Agronomy Journal*, 100(3), 771-776.
- Francis, N. Jordan, P. Porter, T. A. Breland, G. Lieblein, L. Salomonsson, N., Sriskandarajah, M. Wiedenhoeft, R. DeHaan, I. Braden & Langer V. (2011). Innovative education in agroecology: Experiential learning for a sustainable agriculture. *Critical Reviews in Plant Sciences*, 30:1-2, 226-237
- Galt, R.E., Parr, D., Van Soelen Kim, J., Beckett, J., Lickter, M., & Ballard, H. (2012). Transformative food systems education in a land-grant college of agriculture: The importance of learner-centered inquiries. *Agriculture and Human Values*, DOI: 10.1007/s10460-012-9384-8.

- Galt, R.E., Clark, S.F., Parr, D. (2012). Engaging values in sustainable agriculture and food systems education: Toward an explicitly values-based pedagogical approach. *Journal of Agriculture, Food Systems, and Community Development*, 2(3), 43-54.
- Gergen, K. J. (1985). The social constructionist movement in modern psychology. *American Psychologist*, 40(3), 266-275.
- Glass, C.R., & Fitzgerald, H.E. (2010). Engaged scholarship: Historical roots, contemporary challenges. In Fitzgerald, H.E, Burack, C., Siefer, S.D. (Eds.), *Engaged scholarship: Contemporary landscapes, future directions* (3-8). Lansing, MI: Michigan State University Press.
- Godemann, J. (2006). Promotion of interdisciplinary competence as a challenge for higher education. *Journal of Social Science Education*, 5(2), 51-56.
- Green, G.P., & Haines, A. (2012). *Asset building & community development*. Los Angeles: SAGE Publications.
- Greiner, L. (2011). Rethinking the future of virginia cooperative extension. 8(1). Retrieved from: <http://www.cals.vt.edu/news/pubs/connections/winter11/extension.php>
- Grossman, J., Sherard, M., Prohn, S.M., Bradley, L., Goodell, L.S. & Andrew, K. (2012). An exploratory analysis of student-community interactions in urban agriculture. *Journal of Higher Education Outreach and Engagement*. 16(2), 179-196.
- Guba, E.G. (1981). Criteria for assessing the trustworthiness of naturalistic inquiries. *Educational Communication and Technology*, 29(2), 75-91.
- Guba, E.G., & Lincoln, Y.S. (1985). *Effective Evaluation*. San Francisco, CA: Jossey-Bass.
- Halpern, D. F., & Hakel, M. D. (2003). Applying the science of learning to the university and beyond: Teaching for long-term retention and transfer. *Change*. July/August, 37-41.

- Hammer, J. (2004). Community food systems and planning curricula. *Journal of Planning Education and Research*, 23: 424. doi: 10.1177/0739456X04264907
- Hess D. (2008). Localism and the Environment. *Sociology Compass*, 2(2): 625-638.
doi: 10.1111/j.1751-9020.2007.0082.x
- Hilimire, K., Gillon, S., McLaughlin, B.C., Dowd-Urbe, B., & Monsen, K. L. (2014). Food for thought: Developing curricula for sustainable food systems education programs. *Agroecology and Sustainable Food*, 1-36. doi: 10.1080/21683565.2014.881456
- Jacobsen, K.L., Niewolny, K.L., Schroeder-Moreno, M.S., Van Horn, M., Harmon, A.H., Chen Fasnslow, Y.H., Williams, M.A., & Parr, D. (2012). Sustainable agriculture undergraduate degree programs: a land-grant university mission. *Journal of Agriculture, Food Systems, and Community Development*, 2(3), 13-26.
- Jordan, N., Andow, D., & Mercer, K. (2005). New concepts in agroecology: A service-learning course. *Journal of Natural Resources and Life Science Education*, 34, 83-89.
- Judd, T. & Keith, B. (2012). Student learning outcomes assessment at the program and institutional levels. In Secolsky, C. & Denison, B. (Eds.), *Handbook on measurement, assessment, and evaluation in higher education*. (31-46). New York, NY: Routledge.
- Jungst, S. E., Licklider, B. L., & Wiersema, J. A. (2003). Providing support for faculty who wish to shift to a learning-centered paradigm in their higher education classrooms. *Journal of Scholarship of Teaching and Learning*, 3(3), 69-81.
- Kendall, J. (1990). Principles of good practice in combining service and learning. In *Combining Service and Learning: A Resource Book for Community and Public Service Vol. I*, National Society for Internships and Experiential Education, Raleigh, N.C.: NSIEE.
- Kellogg Commission on the Future of State and Land-Grant Colleges. (1999). *Returning to our*

- roots: The engaged institution*. Washington, DC: National Association of State Universities and Land-Grant Colleges.
- Kolb, D.A. (1984). *Experiential learning: Experience as the source of learning development*. Englewood Cliffs: Prentice Hall.
- Kollmuss, A. & Agyeman, J. (2002). Mind the gap: Why do people act environmentally and what are the barriers to pro-environmental behavior? *Environmental Education Research*, 8(3). doi:10.1080/1350462022145401
- Kreber, C., & Cranton, P.A. (1997). Teaching as scholarship: A model for instructional development. *Issues and Inquiry in College Learning and Teaching*, 19(2),4-13.
- Kreber, C. (2001). The scholarship of teaching and its implementation in faculty development and graduate education. *New Directions for Teaching and Learning*, 86, 79-88.
- Kreber, C., & Cranton, P.A. (2000). Exploring the scholarship of teaching. *Journal of Higher Education*, 71, 476-495.
- Kuh, G.D. (2010). *Five high impact practices: research on learning outcomes, completion, and quality*. Washington, DC: Association of American Colleges and Universities.
- Lattuca, L.R., (2001). *Creating interdisciplinarity*. Nashville: Vanderbilt University Press.
- Lattuca, L., & Creamer, E. G. (2005). Learning as professional practice. *New Directions for Teaching and Learning*, 102, 3-11.
- Lave, J. & Wenger, E. (1991). *Situated learning: Legitimate peripheral participation*. Cambridge University Press: New York, NY.
- Lieblein, G., T.A Breland, L. Salomonsson, N. Sriskandarajah, C. Francis. 2008. Educating Tomorrow's agents of change for sustainable food systems: Nordic agroecology MSc program. *Journal of Hunger and Environmental Nutrition*, 3, 309-327.

- Lindeman, E. (1954). The sociology of adult education. *Journal of Educational Sociology*, 19(1), 4-13.
- Lyson, T. (2004). *Civic agriculture: Reconnecting farm, food, and community*. Lebanon: University Press of New England.
- Lyson, T. (2005). Civic agriculture and community problem solving. *Culture and Agriculture*, 27(2), 92-98.
- Malcolm J., & Zukas, M. (2009). Making a mess of academic work: Experience, purpose and identity. *Teaching in Higher Education*, 14(5), 495-506.
- Merriam, S. B., Caffarella, R. S., & Baumgartner, L. M. (2007). *Learning in adulthood: A comprehensive guide*. San Francisco, CA: Jossey-Bass.
- Morrill Act of 1862, Statutes at Large of the United States of America 12 (1863): 503-505; Eddy, *Colleges for our Land and Time*, 33.
- National Academy of Sciences. (2009). *Transforming agricultural education for a changing world*. Washington, DC: The National Academies Press.
- Niewolny, K. L. Grossman, J. M., Byker, C. B., Helms, J. L., Clark, S. F., Cotton, J. A., Jacobsen, K. L. (2012). Sustainable agriculture education and civic engagement: The significance of community-university partnerships in the new agricultural paradigm. *Journal of Agriculture, Food Systems and Community Development*, 2(3), 27-42.
- Nuemann, A. (2005). Observations: Taking seriously the topic of learning in studies of faculty work and careers. *New Directions for Teaching and Learning*, 102, 63-83.
- Packer, M.J. (1999). The ontology of learning. Paper presented at the meeting of AERA, Montreal, Canada.

- Packer, M.J., Goicoechea, J. (2012). Sociocultural and constructivist theories of learning: Ontology, not just epistemology. *Educational Psychologist*, 35(4), 227-241.
- Palmer, P. J. (1993). *To know as we are known*. San Francisco: Harper Collins Publishers.
- Palmer, P.J., & Zajonx, A. (2010). *The Heart of Higher Education*. San Francisco, CA: Jossey-Bass.
- Parr, D.M., & Van Horn, M. (2006). Development of organic and sustainable agriculture education at the university of California, Davis: A closer look at practice and theory. *Horticulture Technology*, 16(3), 426-431.
- Parr, D., Trexler, C.J. (2011). Student's experiential learning and use of student farms in sustainable agriculture education. *Journal of Natural Resources & Life Sciences*, 40, 172-180.
- Parr, D., Trexler, C. J., Khanna, N. R., Battisti, B. T. (2007). Designing sustainable agriculture education: academics' suggestions for an undergraduate curriculum at a land grant university. *Agriculture and Human Values*, 24, 523-533.
- Perkins, D., Jay, E., Tishman, S. (2010). New conceptions on thinking: From ontology to education. *Educational Psychologist*, 28(1), 67-85.
- Peters, S. (2006). Every farmer should be awakened: Liberty hyde bailey's vision of agricultural extension work. *Agricultural History Society*, 80(2), 190-219.
- Pondish, C. (2012). Qualitative evaluation. In Secolsky, C. & Denison, B. (Eds.), *Handbook on measurement, assessment, and evaluation in higher education*. (473-482). New York, NY: Routledge.
- Pretty, J. (1995). Participatory learning for sustainable agriculture. *World Development*, 23(8), pp.1247-1263.

- Robbins, D. (1999). Prologue. In R. Rieber (Ed.), *The collected works of L.S. Vygotsky: Volume 6 Scientific Legacy* (pp. v-xi). New York, NY: Kluwer.
- Roberts, T. G., & Ball, A. (2009). Secondary agricultural science as content and context for teaching. *Journal of Agricultural Education*, 50(1), 81-91.
- Rogers, A. (2004). *Non-Formal education: Flexible schooling or participatory education?* Dayton, OH: The Kettering Foundation Press (Preface and Introduction). New York: Springer.
- Roper C. D., & Hirth, M. A. (2005). A history of change in the third mission of higher education: The evolution of one-way service to interactive engagement. *Journal of Higher Education Outreach and Engagement*, 10(3), 3-21.
- Rossmann, G.B & Rallis, S.F. (2003). *Learning in the field: An introduction to qualitative research*. Thousand Oaks, CA: Sage Publications.
- Sandmann, L. R. (2008). Conceptualization of the scholarship of engagement in higher education: A strategic review, 1996-2006. *Journal of Higher Education Outreach and Engagement*, 12(1), 91-104.
- Smith, J. K. & Hodkinson, P. (2008). Relativism, criteria, and politics. In Denzin, N. K. & Lincoln Y. S. (Eds.), *Collecting and Interpreting Qualitative Materials Third Edition*, (pp. 411-434). Los Angeles, CA: Sage Publications
- Stake, R.E. (2010). *Qualitative research: Studying how things work*. New York, NY: The Guilford Press.
- Sustainable Agriculture Education Association [SAEA]. (n.d.-b). *Academic Programs*. Retrieved from <http://sustainableaged.org/Resources/AcademicPrograms/tabid/86/Default.aspx>

- Tolbert, C. M., Irwin, M.D., Lyson, T.A., & Nucci, A.R. (2002). Civic community in small-town America: How civic welfare is influenced by local capitalism and civic engagement. *Rural Sociology*, 67, 90-113.
- Usher, R. (1997). *Experience pedagogy and social practices*, In Illeris, K. (2009). *Contemporary Theories of Learning* (169-183). New York: NY: Routledge Taylor & Francis Group
- Vogelgesang, L.J., Denson, N., & Jayakumar, U.M. (2010). What determines faculty-engaged scholarship?. *The Review of Higher Education*, 33(4), 437-472. doi: 10.1353/rhe.0.0175.
- Von Glosserfeld, E. (1995). *Radical constructivism: A way of knowing and learning*. New York, NY: Routledge.
- Vygotsky, L. S. (1978). Interaction between learning and development. In M. Cole, V. John-Steiner, S. Scribner, & E. Souberman, L.S. (Eds.) *Vygotsky: Mind in Society* (pp. 79-91). Cambridge, MA: Harvard.
- Vygotsky, L. S. (1999). Sign operation and organization of mental processes. In Rieber, R. (Ed.), *The collected works of L.S. Vygotsky: Volume 6 Scientific Legacy* (pp. 39-44). New York, NY: Kluwer.
- Wenger, E. (1991). *A social theory of learning*, In Illeris, K. (2009). *Contemporary Theories of Learning* (209-218). New York: NY: Routledge Taylor & Francis Group
- Wenger, M., & Hornyak, M. (1999). Team teaching for higher level learning: a framework of professional collaboration. *Journal of Management Education*, 23, 311-327.
- Wright, D. W. (2006). Civic engagement through civic agriculture: Using food to link classroom and community. *Teaching Sociology*, 34, 224-235.

- Wynne, W.D. (2006). Civic engagement through civic agriculture: Using food to link classroom and community. *Teaching Sociology*, 34, 244. doi:10.1177/0092055X0603400302
- Yin, R. Y. (1997). Case study evaluations: A decade of progress. *New Directions for Evaluations*, 76, 69-78.
- Yin, R.Y. (2012). Case study methods. (Eds.) Cooper, H. *APA Handbook of Research Methods in Psychology: Vol. 2 Research Designs*. American Psychological Association: 141-155.
- Zalanga, S. (2009). Interdisciplinary studies and scholarship: Issues, challenges, and implications for third world development and social change. *Human Architecture: Journal of the Sociology of Self-Knowledge*, 7(3).
- Zukas, M. (2006). Pedagogic learning in the pedagogic workplace: Educators' lifelong learning and learning futures. *International Journal of Pedagogies and Learning*, 2(3), 71-80.

APPENDICES

Appendix A: Semi-Structured Interview Questions

From a sociocultural learning perspective, how do faculty learn within a sustainable agriculture program at a land grant university?

1. How do faculty understand and participate in collaborative teaching?

- a) Describe an experience where you were involved in a CAFS course that was collaboratively taught.
 - i. How would you describe the model of collaborative teaching that was used in this course or courses?
 - ii. What specific aspects of the course(s) made it uniquely collaborative?
 - iii. Please feel free draw out the model in an organizer to demonstrate.
- b) What was rewarding about this collaborative teaching experience? How so?
- c) What was challenging about this collaborative teaching experience? In what way?
- d) How would you have implemented the course, if done alone?
- e) As a faculty member, what kinds of outcomes may have resulted from this teaching experience?

2. How do faculty understand and participate in interdisciplinary teaching?

- a) Moving into a conversation specifically regarding interdisciplinarity, how would you define interdisciplinarity in 25 words or less?
 - i. Please feel free to jot down brainstorming words and diagrams on the scratch paper.
- b) Describe an experience where you were involved in interdisciplinary teaching in the CAFS program

- c) How did the experience impact your teaching practice?
- d) What did you find rewarding about the experience?
- e) What did you find challenging about the experience?

3. *How do faculty understand and participate in service-learning as a pedagogical practice?*

- a) Describe an experience where you were involved in a course that implemented service-learning as a pedagogical practice.
- b) What does service-learning look like in the CAFS program?
- c) What does it look like in the classroom?
 - i. What does it look like in the field?
 - ii. Please feel free to jot down brainstorming words and diagrams on the scratch paper.
- d) How does service-learning, as an educational tool, impact your teaching practice?
- e) What has been rewarding about your experiences with service-learning? Why?
- f) What was challenging about your experience with service-learning? How so?

4. *What are social outcomes relevant to the role of sustainable agriculture education faculty at a land grant university?*

- a) While teaching other faculty in the civic agriculture and food systems minor, describe a time where you felt that you were learning.
 - i. How does this interaction impact your teaching or research practices? How so?
- b) Expanding on that, describe a time where you felt that you were collaborating with community-partners in the CAFS program.
 - i. How did this interaction impact your teaching or research practices? In what way?

- ii. How does this teaching and learning environment impact your experience as faculty?
- c) Give me an example of something that has resulted from your experience teaching within the CAFS minor?
 - i. What impact has this experience had on your research, teaching, and outreach practice as faculty at a land grant university?
- d) How do you see sustainable agriculture education impacting the culture of land grant universities?
- e) Specifically, what are some of the larger, social or cultural, implications of the CAFS minor at Virginia Tech? For example, how do you see sustainable agriculture education influencing agriculture and life science education in the college? The university? If applicable, what about nationally?

Appendix B: Interview Consent Form

VIRGINIA POLYTECHNIC INSTITUTE AND STATE UNIVERSITY

Informed Consent for Participants in Research Projects Involving Human Subjects

Title of Project: Sustainable Agriculture Education at a Land Grant University: Exploring the Experience of Faculty and Community-Partners in Collaborative and Interdisciplinary Curricula

Investigator: Jennifer Helms, Virginia Tech Graduate Student (PI); Kim Niewolny Faculty (Co-PI); Susan Clark, Faculty (Co-PI); Kate McConnell, Faculty (Co-PI); Curt Friedel, Faculty (Co-PI)

I. Purpose of this Research/Project

The purpose of this study is to explore the mediated learning of faculty and community-partners engaged in experiential-based sustainable agriculture education (SAE) curricula at a land grant university (LGU) specifically, I seek to understand faculty work as learning through engagement with faculty, community-partners, and students.

For this project at least 7 people will be contacted to participate in this research study. The subject pool will use the following criteria to choose participants: Faculty and Community-Partners teaching in the Civic Agriculture & Food Systems minor at Virginia Tech.

II. Procedures

First, you will be initially contacted by email and introduced to the study. Then you will be asked to participate in a 60-minute interview.

Second, those who choose to fully participate in this project will be contacted no later than one week of the initial email to given information about when and where the interview will be held. The interview will take place at the convenience of the participant.

Third, the informed consent form will be signed before the interview. The interview will be used to gather information about collaborative and interdisciplinary courses in sustainable agriculture education. The interview will last no longer than 60 minutes and will include 4 semi-structured questions to be discussed.

III. Risks

There are no more than minimal risks involved, since the study only involves an individual interview.

IV. Benefits

The benefits you could experience include overcoming the barriers you face as part of a collaborative teaching environment; thus, benefitting your teaching competencies. The larger benefit that could be seen includes a better understanding of the benefits and challenges to

collaborative and interdisciplinary teaching and could have implications on the Civic Agriculture & Food Systems minor at Virginia Tech.

No promise or guarantee of benefits has been made to encourage you to participate.

V. Extent of Anonymity or Confidentiality

All participation in this project will be kept confidential. The only person that will have a list of your names will be the investigator. Once the project is completed the list of names will be destroyed.

The interview will be recorded (audio only), transcribed, and kept secure for the duration of the project by the investigator, and not utilized by any other person. Once the project is completed the tapes will be destroyed.

VI. Compensation

There will be no compensation for your participation in the interview.

VII. Freedom to Withdraw

You are free to withdraw from a study at any time without penalty. You are free not to answer any questions that they choose without penalty.

IX. Subject's Permission

I have read the Consent Form and conditions of this project. I have had all my questions answered. I hereby acknowledge the above and give my voluntary consent:

_____ Date _____
Subject signature

_____ Date _____
Witness (Optional except for certain classes of subjects)

Should I have any pertinent questions about this research or its conduct, and research subjects' rights, and whom to contact in the event of a research-related injury to the subject, I may contact:

_____ Jennifer Helms _____
Investigator(s)

770-633-3388/jh7788@vt.edu
Telephone/e-mail

_____ Kim Niewolny _____
Faculty Advisor

540-231-5784/niewolny@vt.edu
Telephone/e-mail

Appendix C: Interview Participation Email Communication

Prepared by: Jennifer Helms

Invitation Email for CAFS Faculty and Community-Partner Interviews

Dear CAFS faculty and community partners,

I will be conducting research on the mediated learning of faculty and community-partners engaged in experiential-based sustainable agriculture education (SAE) curricula at a land grant university (LGU) specifically, I seek to understand faculty work as learning through engagement with faculty, community-partners, and students. This thread of inquiry is an extension of previous research, conducted by faculty involved in the CAFS minor, exploring experiences and dynamics across the campus within various programs and settings engaging in collaborative teaching practices. The role of this research will be to explore the experiences within a context specific program in agriculture and life sciences. This exploration will assist in developing my dissertation research and bring to light the dynamics of collaboration within an interdisciplinary minor.

I would like to invite you to participate in a 60 minute interview where you will be given the floor to discuss your experiences and thoughts while participating in the teaching and learning of the CAFS minor. You are under no requirement to participate, it is fully voluntary. Please respond to this email if you desire to be contacted again to schedule a meeting time. I appreciate all that you do as part of the CAFS minor and value your time and input.

Thank you and I look forward to working with you,

Regards,

Jennifer Helms

Agricultural and Extension Education

Graduate Student

Kim Niewolny

Agricultural and Extension Education

Faculty

Susan Clark

Department of Horticulture

Adjunct, Dept. Human Nutrition, Foods and Exercise

Faculty

Kate McConnell

Office of Assessment and Evaluation

Assistant Director/Faculty

Curt Friedel

Agricultural and Extension Education

Faculty

Appendix D: Observation Verbal Consent Protocol

VIRGINIA POLYTECHNIC INSTITUTE AND STATE UNIVERSITY

Informed Consent for Participants in Research Projects Involving Human Subjects

Title of Project: Sustainable Agriculture Education at a Land Grant University: Exploring the Experience of Faculty and Community-Partners in Collaborative and Interdisciplinary Curricula

Investigator: Jennifer Helms, Virginia Tech Graduate Student (CO-PI); Kim Niewolny Faculty (PI); Susan Clark, Faculty(Co-PI); Kate McConnell, Faculty (Co-PI); Curt Friedel, Faculty (Co-PI)

VIII. Purpose of this Research/Project

The purpose of this study is to explore the mediated learning of faculty and community-partners engaged in experiential-based sustainable agriculture education (SAE) curricula at a land grant university (LGU) specifically, I seek to understand faculty work as learning through engagement with faculty, community-partners, and students.

For this project at least 30 people will be contacted to participate in this research study. The subject pool will use the following criteria to choose participants: Faculty, Community-Partners, and students teaching and learning in the Civic Agriculture & Food Systems minor at Virginia Tech.

IX. Procedures

First, verbal consent from faculty and community-partners teaching in the ALS 2204 Fall 2013 course and CAFS Taskforce members will be obtained for observational data collection.

Second, the students participating in ALS 2204 Fall 2013 will be introduced to the study purpose by the graduate student, Jennifer Helms. The study will be described using 3 power point slides embedded in the introduction to the course during the first meeting.

Third, student verbal consent will be observed by faculty and graduate student in ALS 2204 Fall 2013.

Fourth, graduate student/researcher will use pad and pen to collect notes during course meeting times and compose detailed field notes immediately after course meetings.

Fifth, graduate student/researcher will use lap top to collect notes during ALS 2204 Fall 2013 collaborative teaching team meetings and CAFS Taskforce meetings followed by detailed field notes immediately after meetings.

Sixth, graduate student/researcher will use constant comparative method to analyze field note data in Atlas ti.

Text read to obtain verbal consent:

The Civic Agriculture and Food Systems Minor at Virginia Tech is part of the emerging field of sustainable agriculture education. I am focusing my dissertation research on the learning of faculty engaged in experiential-based sustainable agriculture education curricula at a land grant university. I will be conducting an observational study this Fall semester, and will be observing faculty, community-partners, and students participating in the CAFS minor.

There are no more than minimal risks involved, since the study only involves observational data. The benefits of the study are an increased understanding of faculty work as learning in sustainable agriculture education programs. Data collected will be analyzed at the end of the semester after final grades are submitted and will be kept confidential.

Please give a verbal “yes” if you agree to participate in this study.

X. Risks

There are no more than minimal risks involved, since the study involves only observational data. The graduate student/researcher is also the GTA for the course. No data analysis will occur until the end of the semester and no student grade will be affected by the study. The participants observed are faculty and community-partners engaging in teaching and learning in sustainable agriculture education at a land grant university.

XI. Benefits

The benefits participants could experience include overcoming the barriers faced as part of a collaborative teaching environment; thus, benefitting teaching competencies. The larger benefit that could be seen includes a better understanding of the benefits and challenges to collaborative and interdisciplinary teaching and could have implications on the Civic Agriculture & Food Systems minor at Virginia Tech.

No promise or guarantee of benefits has been made to encourage participation.

XII. Extent of Anonymity or Confidentiality

All participation in this project will be kept confidential. The only person that will have a list of names will be the investigator. Once the project is completed the list of names will be destroyed.

XIII. Compensation

There will be no compensation for participation in the study.

XIV. Freedom to Withdraw


Participants are free to withdraw from a study at any time without penalty.

IX. Subject's Permission

Faculty, community-partners, and students have been informed of the conditions of this project and have had all questions answered. Verbal consent will be obtained during the first course meeting of the semester.

Appendix E: Powerpoint Slides used to gain verbal consent in ALS 2204 Fall 2013

**Civic Agriculture and Food Systems
Research: Faculty Work as Learning**



Civic Agriculture and Food Systems

The Civic Agriculture and Food Systems Minor at Virginia Tech is part of the emerging field of sustainable agriculture education. I am focusing my dissertation research on the learning of faculty engaged in experiential-based sustainable agriculture education curricula at a land grant university. I will be conducting an observational study this Fall semester, and will be observing faculty, community-partners, and students participating in the CAFS minor.

There are no more than minimal risks involved, since the study only involves observational data. The benefits of the study are an increased understanding of faculty work as learning in sustainable agriculture education programs. Data collected will be analyzed at the end of the semester after final grades are submitted and will be kept confidential.

Please give a verbal "yes" if you agree to participate in this study.

Appendix F: Additional Supporting Data

Theme 1: Collaborative Teaching in Higher Education

Categories:

1. Roles and Participation in Collaborative Teaching

P1: “the instructor of record was the one who was there almost all of the time because you know he was in charge of making sure the consistency was there and he would rotate people in and try to make it as seamless as possible to keep things moving forward.”

P8: “the model that is used, well, it’s there is a lead instructor of the course but he involves all the other instructors every step of the way with the syllabus what’s going to be taught on certain days, how we actually go about teaching a lot of the lectures. Now some might be left up to the individual instructor if it’s their topic on a given day they will lecture on that but most of them we all have input on whether we do or don’t go with that lecture and how that fits into the whole framework. So the model is that we are, we meet regularly once a week on Fridays before the Friday two hour class and talk about the next weeks lectures that are coming up and how we all might be involved in it so, it’s very open and inclusive for all of the faculty to participate.”

2. Understanding the Collaborative Teaching Model

P4: “We teach together throughout and that’s an interesting experience where we feel like there’s certain pieces where it’s very clear where one faculty member has more expertise than the other person and vice versa and we want because we think like faculty and act like faculty we are ok with that. Like yeah, I don’t need to do what you do and you don’t need to do what I do but I’m gonna learn from you and we’re gonna figure the plan out.”

P6: “Well I think this was predicated on the previous intro course model of gathering the team, usually some time the semester before the class is going to be taught and have planning sessions on a weekly basis to kind of map out the blue print for the course...the syllabus and the calendar and hammer out some of the assignments and whose roles are doing what with regard to the gta’s responsibilities and community partners responsibility it was a really more dynamic yet very receptive to everybody’s ideas so we blended it together so there was a thumbprint to have each person on that collaborative teaching team represented on the syllabus on the assignments.”

3. Feelings toward Collaborative Teaching

P4: “I intrinsically value working within a partnership.”

P6: “I think the collaborative teaching team which was made up of the gta, myself, another faculty member in HNFE and our community partner really planned in a coordinated effort each week the experiences that would happen with the subsequent class session in a very open, very accepting to creative ideas, concept with very little tension so I think that was somewhat revealing in comparison to other collaborative teaching courses.”

P7: “I felt myself going back to college student mode. I mean like...this is really cool...I am real excited to learn that.”

4. Learning Pedagogical Practices

P1: “So from that standpoint, if you’re looking at learning and faculty taking stuff from one thing and putting it to another thing, yeah it hangs together.”

P6: “Don’t have to use them all at any one time or just you know it’s a growing toolbox of skills that I’ve tried or we’ve tried and you have support behind it whereas if you try it and you’re by yourself it may not work, it’s kind of that having a support structure within the classroom.”

P8: “I think in the end what’s been rewarding for me is seeing the different personalities, the different instructors, the way they go about it [teaching].”

5. Navigating Administrative Structure

P6: “I think that the master plan, introducing it [CAFS] as a minor over a major. I think we’re a little more protected than if we were a major with small numbers but I don’t make those decisions but I did make the decision to have it as a minor for that reason.”

6. Navigating Collaborative Work

P1: “continue having the conversations and listen with respect and realize that not everybody is going to agree with everybody.”

P6: “but it wasn’t easy it wasn’t easily accomplished and it was difficult to explain that whole hierarchy or structure, academic structure of things so even if they [students] could come to me and I could agree with them I could only make recommendations but at the end of the day the class was still going to be structured how the primary instructor wanted it done.”

P6: “the nature of everybody’s time commitment which is the major problem. That might be the major road block there you know...it is difficult to make a meeting time so it’s always been and it’s going to continue to be more adaptive.”

7. Outcomes of Collaborative Work

P3: “it just gives me the confidence that all these things can work together.”

P3: “they are people who want to do what you want to do too and gonna come at it from different perspectives but it looks like it’s just going to make great sense to me and to be able to say that with confidence.”

Theme 2: Interdisciplinary Teaching in Practice

1. Learning Disciplinary Knowledge

P1: “Part of it is just looking for information. You’ve got to go out and figure it out. Part of it is just actually if someone throw something out there and you go wait a minute I’ve never thought of that before, I need to go look this up. There’s a lot of this in that class it’s so complex...”

P7: “Because I am out there [in the field and classroom] I may of learned a little something about soils and I learned a little something about animals that I didn’t know before. I think that is, you don’t find that [faculty work as learning] too often.”

2. Recognizing Disciplinary Perspective

P6: “I don’t know how I can answer that because I don’t have a discipline anymore and I perceive that I have a discipline for the nature of how it fell out. I have no problem reading all sorts of even doing this stuff, I read John Dewy you’re not going to find someone reading that on a regular basis. I mean yeah so I would say that I don’t consider myself, I couldn’t speak for others because I don’t, and I’m struggling to refine or essentially do another PhD on top of it.”

P6: “that’s the beauty of this collaborative teaching in my mind is the students continually gain more from having more disciplines in the conversation, different perspectives around some of these topics.”

P7: “I think being kind of the science course within the minor, being able to take that information and being able to translate it to a lay audience is a really good learning tool.”

3. Understanding Interdisciplinarity

P1: “you have different perspectives coming from different faculty you also have perspectives coming from students that are in the minor.”

P6: “there might be some interweaving but it’s not intentional, it’s just something that emerged.”

Theme 3: Service-Learning as Reflective/Critical Practice

1. Understanding Service-Learning as Pedagogical Practice

P2: “They’re assigned to a site of interest that goes with the CAFS minor, the course, they’re professional or personal interest. We have, yeah I’d say, we have excellent sites that we kind of match up in terms of what their activities will be and how it you know meets the courses needs and what the students’ needs are.”

P3: “Civic ag where we it’s just so important. It’s not just go put in some hours it’s just so hard although while I had been firmly on the soapbox dissing the service-learning, ok put in 10 hours where ever you please and we gotta a lot of classes that come and do that and they don’t necessarily come out to do it. They just say I’ve learned all about, sorry these are lovely people,

but I know how to implement a business plan so here's your business plan. It's like wow that's their service-learning hours, they come up with a business plan they come up with a project that's also and they come out and there's no connection to I wonder what this place is doing, I wonder what the purpose of it is, I wonder who these people are, I haven't seen any other people out here, I wonder who does come out her and so in the end you get a business plan or a whatever they're working on that has no connection and it just breaks my heart and makes me beat myself up late at night, how did I not convey what this place is?"

2. Understanding the Community Partner as Educator

P3: "I wonder what the term is because it would be wrong to call that, oh I'm in the real world, looks pretty real. I think everybody's feeling like it's pretty real and it's not right to say that."

P6: "I think that partnership has been pretty fundamental to the hands on piece."

P6: "they have to sit down together with the community partner and map it out and then throughout that semester there are check points along the way and that's really decided on whoever their community partner is."

Theme 4: Participation in Sustainable Agriculture Education Programs

1. Identifying Student Learning

P4: "That's also challenging for the students because they're not always prepared for thinking like that. They're still a bit more individualistic because that's who they are, their age...students are less and less able really engage very critically without getting shut down, it's a fine balance."

P6: "I don't know how students perhaps receive that [collaborative teaching dynamics]."

P6: "I'm always humbled reading students final reflections and I get the opportunity to do that in the capstone course, to hear them reflect on their time within the minor as being incredibly powerful."

P7: "I think they certainly get a good education that way, they see both sides of it [problem solving]."

2. Learning Situated in Sustainable Agriculture Education

P8: "We would go out, it would be a field trip to a farm and while we're on the farm this farm...there were vegetable crops around and the weeds and we were basically taking the students out there and showing them the various pests and along the way there were different crops that they may not of ever seen growing, okra for example. There might have been weeds that were growing in these plots that I previously didn't know what that weed was but because we had a weed scientist they were showing them and then vice versa there may have been insects that some of the other faculty didn't know."

P6: “the nature of the word sustainability and agriculture can be twisted in so many different ways that I would argue or I could argue that everybody’s working towards sustainability in agriculture and because of that without any clear understanding of what’s meant by sustainability or sustainable agriculture we all do it anyway and so in terms of the minor or calling it sustainability in agriculture it means nothing.”

Appendix G: IRB Approval Letter



Office of Research Compliance
Institutional Review Board
North End Center, Suite 4120, Virginia Tech
300 Turner Street NW
Blacksburg, Virginia 24061
540/231-4606 Fax 540/231-0959
email irb@vt.edu
website <http://www.irb.vt.edu>

MEMORANDUM

DATE: July 15, 2013
TO: Kathryn D McConnell, Susan Clark, Curtis Robert Friedel, Kim Niewolny, Jennifer Louise Helms
FROM: Virginia Tech Institutional Review Board (FWA00000572, expires April 25, 2018)
PROTOCOL TITLE: Sustainable Agriculture Education at a Land Grant University: Exploring the Experience of Faculty and Community-Partners in Collaborative and Interdisciplinary Curricula
IRB NUMBER: 13-618

Effective July 15, 2013, the Virginia Tech Institutional Review Board (IRB) Administrator, Carmen T Papenfuss, approved the New Application request for the above-mentioned research protocol.

This approval provides permission to begin the human subject activities outlined in the IRB-approved protocol and supporting documents.

Plans to deviate from the approved protocol and/or supporting documents must be submitted to the IRB as an amendment request and approved by the IRB prior to the implementation of any changes, regardless of how minor, except where necessary to eliminate apparent immediate hazards to the subjects. Report within 5 business days to the IRB any injuries or other unanticipated or adverse events involving risks or harms to human research subjects or others.

All investigators (listed above) are required to comply with the researcher requirements outlined at:

<http://www.irb.vt.edu/pages/responsibilities.htm>

(Please review responsibilities before the commencement of your research.)

PROTOCOL INFORMATION:

Approved As: **Expedited, under 45 CFR 46.110 category(ies) 6,7**
Protocol Approval Date: **July 15, 2013**
Protocol Expiration Date: **July 14, 2014**
Continuing Review Due Date*: **June 30, 2014**

*Date a Continuing Review application is due to the IRB office if human subject activities covered under this protocol, including data analysis, are to continue beyond the Protocol Expiration Date.

FEDERALLY FUNDED RESEARCH REQUIREMENTS:

Per federal regulations, 45 CFR 46.103(f), the IRB is required to compare all federally funded grant proposals/work statements to the IRB protocol(s) which cover the human research activities included in the proposal / work statement before funds are released. Note that this requirement does not apply to Exempt and Interim IRB protocols, or grants for which VT is not the primary awardee.

The table on the following page indicates whether grant proposals are related to this IRB protocol, and which of the listed proposals, if any, have been compared to this IRB protocol, if required.

Invent the Future

VIRGINIA POLYTECHNIC INSTITUTE AND STATE UNIVERSITY
An equal opportunity, affirmative action institution